40 Rock


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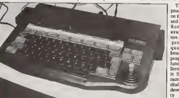
Vol 3 No 50


# Enterprise arrives

AFTER one of the longest production delays yet in the home computer industry, the 64K Enterprise computer should begin to trickle through to the shops before Christmas.

"We are beginning supplies to Prism, our distributors, this week " said Enterprise's marketing manager Mike Shirley "Before Christmas, the computer will only be available in nominal quantities but we hope to reach full production by February 1985 "

Originally priced at just under £300 the Enterprise will now cost £249 95



The Enterprise is based on the Z80 chip and of its 64K Rom 58K is available for use. It has a 'professional' quality keyboard with 8 programmable function keys. Screen display is 56×84 characters, and includes a 'windowing' facility The machine has twin cassette parts

continued on page 5 ▸

# Tramiel talks in UK

ATARI boss Jack Tramiel paid a flying visit to the UK last week to outline the company's plans for next year — including the launch in January of a new 16-bit 68000 machine for under £300

Atari plans to develop four different 'families' of computers.

It will continue to produce the 2600Jr and Jr video games machines in the video console range

Atari boss Jack Tramiel

A series of four 8-bit machines is planned, comprising a redesigned version of the 800XL (64K), a 128K model, a new version incorporating a music keyboard, and a portable lap-held model.

The new 16-bit micro, based on the 68000 processor, will use a new operating system, to be called TOS (Tramiel operating system) jointly developed by Atari and Digital Research. Di-

continued on page 7 ▸

## Timefame gains support

TIMEFAME International's removal from BT's Prestel service has sparked off minor security breaches on BT's prestige Telecom Gold system.

Computer giants ICL discovered messages left by hackers in mail boxes used for demonstration purposes referring to Timefame's removal

Timefame has also received messages of support for its action from MPs — through the post — and one from the editor of the Micromouse database on Micronet 800

Timefame's removal came after a chain of events dating back to the Prestel breach of security at the beginning of November, when personal mail boxes including that of Prince Philip were broken into (see *Popular Computing Weekly*, November 8).

After those incidents Prestel changed all its information providers' (IPs) codes.

Timefame then discovered that some of its pages had been used over a weekend and the company notified British Telecom of this apparent lapse

Timefame claims there was no response from British Telecom regarding any investigation into a breach of files after the change of identity codes

On November 28, Timefame prepared a notice to go into its 'letterbox', an area where Ti-

continued on page 5 ▸


**INSIDE** ) MSX CLONES COMPARED ) MINTER LISTING )



POPULAR Computing WEEKLY Vol 3 No 50

# ) View

It seems the near-mythical Enterprise will shortly be with us.

Production of the machine, which was first announced 15-18 months ago, has been dogged by an unprecedented series of delays Not only that, but the company behind the micro has gone through more identity crises in that time than would seem credible — first Samurai, then Elan, then Flan (muffled laughter) and now Enterprise

When first conceived the 48K Spectrum was still £175 The Oric Atmos had yet to appear The QL, Spectrum+, Commodore Plus/4 and C16 were all but a twinkle in their designers eyes.

In 1983 the Enterprise was greeted enthusiastically by potential buyers, press and programmers alike Its £199 price made it an exceptional machine

How does it look now? Now it costs £250 Is it still a world beater?

In fact, the machine has withstood the passage of time remarkably well. Where it was excellent, it is now merely competitive.

The Enterprise has been lucky that the QL got off on the wrong foot Lucky that Commodore's Plus/4 adds so little to the C64 And lucky that the Japanese MSX design was so conventional and cautious

So — despite being a little overpriced, and even though its initial software support looks weak — the Enterprise still looks quite attractive

But the Spectrum and Atari 800XL (both at £129) represent fiercesome competition.

Moreover, next year, Atari's £300 16-bit machine and Commodore's C128 and Amiga machines are likely to quickly overshadow the Enterprise.

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**Published by** Sunshine Publications Ltd 12 13 Little Newport Street London WC2H 7PP Tel 01-437 4343 Telex 296275 **Typeset by** The Artwork Group 55-63 Goswell Road London EC1 In association with Ink on Paper Ltd **Printed by** East Midland Litho Printers Ltd Oundle Road Woodston Peterborough PE2 9QR **Distributed by** S M Distribution London SW9 tel 01 274 8611 telex 261643 

ABC
86,052 copies sold every week (Jan-June 1984 ABC)

**How to submit articles** Articles which are submitted for publication should not be more than 2000 words long The articles and any accompanying programs should be original It is breaking the law of copyright to copy programs out of other magazines and submit them here — so please do not be tempted **Accuracy** *Popular Computing Weekly* cannot accept any responsibility for any errors in programs we publish although we will always try our best to make sure programs work

**Computer Trade Association Magazine of the Year**

## Enterprise

continued from page one

RS423 and Centronics interfaces, a Rom slot which can handle up to 64K Rom cartridges and stereo sound output. A structured Basic is included, together with a built-in word processor

The Enterprise has a flexible range of graphic modes — fifteen in total — dictated by the number of colours the user wishes to display on screen. There is also a choice of two text modes — 40 cols or 80 cols

A very limited amount of software will also be available at launch. Four arcade programs written entirely in Basic will be released this year

"Obviously we will be doing a wide range of machine code games later, but at least we're getting some out," Mike continued.

The four packs, labelled Starter Software, comprise *Dictator*, a strategy game, *Five in a Row*, a ball game simulation, and two simply entitled *Games Pack 1* and *Games Pack 2*.

"These are simple games where the user is encouraged to break into the program to see how they work," said Stephen Gandy, Enterprise s product manager. "These will each be priced at £5 95, though our later games will probably be nearer the £7 95 mark."

Intelligent Software has written a range of twelve products, due out in February under the Enterprise label. These include an assembler/disassembler, *Chess*, Lisp and Forth languages, an arcade game *Jungle Jim*, and *Nightmare Knight* a graphic and text adventure

A number of software houses are also working to produce program conversions for the Enterprise, including Quicksilva and Mikro-Gen.

On the peripherals side, Enterprise plans to release, under the Enterprise name, a medium resolution monitor manufactured by Microvitec, for £329 95 and a Mannesman Tally dot-matrix printer, running at 100 cps, at around £230

The company is also talking to Kempston about the possibility of producing further peripherals for the machine.

"We will be releasing both single and dual disc drives, running standard 3½ inch discs and with CP/M built in," Stephen continued. The price for the dual system will probably be £599 95 or similar"

These products, plus the 128K version of the computer, are all scheduled for release in the first half of next year

The Enterprise is being manufactured in Perth, Scotland, by GRI Electronics.

## Timeframe

continued from page 1

melarse invites Prestel users to place and exchange messages and letters of topical interest. The notice stated that there could be a possibility of a 'mole' in British Telecom itself.

The notice was displayed on Prestel late on November 28 and the next day, Timefame received a letter from British Telecom stating that Timefame was in breach of a clauses in the Prestel contract, stating that subscribers should not bring BT or Prestel into disrepute. Timefame was asked to remove its letterbox notice and display a retraction.

The retraction asked for was not printed, and Timefame was blacked from Prestel within hours.

Timefame is apparently now seeking a court injunction against its blacking by BT

Timefame declined on Friday to comment on the situation.

## Kicking off

OCEAN has released *Match Day*, a football simulation game for the Spectrum.

For either one player (playing against the computer), or two players, you control your side's movements on pitch.

Ocean is not planning any versions for other machines at the moment. *Match Day* costs £7 95

●A BBC 2 documentary *Commercial Breaks* being shown tonight (December 13) at 8.00pm visits both Ocean and Imagine, the Liverpool company which folded last summer.

# Acorn cuts US drive

DISAPPOINTING sales in the US of its BBC micro has led Acorn to drastically reduce its presence in the United States.

Acorn opened an office with around 40 staff and a warehouse in the US about a year ago It planned to capture 10% of the educational market with the BBC, buying the US rights to the BBC's educational television series based on the computer

"Acorns optimism wasn't justified and the market impact turned out to be far less than 10%", said an Acorn spokesman.

"Acorn has reduced its US facility by around 80% which brings it more in level with its US sales," he continued. "However, there is still a small office out there to deal with software support for schools which have taken the BBC"

Acorn is also retaining its research facility at Palo Alto in California.

●Acorn's share price dropped 14p to 61p last week, after the news that it had cut down its US operation. This compares with a striking price per share of 120p when Acorn entered the USM fourteen months ago

## Extender

IF you find your Spectrum edge connectors are wearing thin, Kempston has brought out an Extender Cable, to give a flexible connection between the Spectrum or Spectrum+ and any Kempston interface

The Extender is also fitted with a replaceable edge card.

The device is priced at £7.94. Details from Kempston Micro Electronics, Unit 30, Singer Way, Woburn Road Industrial Estate, Kempston, Beds.

## Elite bug is removed

THE bug in Acornsoft's Electron version of its top-selling game *Elite* is to be removed (see *Popular Computing Weekly*, December 6)

Electron owners who bought *Elite* discovered they could not 'hyperdrive' from one galaxy to another as on the BBC version.

"A new version of the game is being brought out, we hope before Christmas, in which you can 'galactic hyperspace'," said an Acorn spokeswoman.

"Acorn will offer replacements to those who have already bought *Elite* on the Electron."

# Emulator for CBM 64

A NEW emulator to enable the Commodore 64 to run BBC Basic has been developed by a group of companies

GH Co-ordinates, Artec and Milton Keynes Music and Computers, have written the emulator between them.

"The hardware differences between the machines mean that the emulation isn't exact to the last detail," said a spokesman for the consortium.

Most machine-code programs cannot be run using the emulator on the C64 but programs written entirely in BBC Basic should work.

"The main aim of the emulator is to enable schoolchildren owning a 64 to do homework from their school's BBC"

The BBC Emulator should be in the shops next week, priced at £14 95 on cassette

**Micronet — a correction**

**AN ITEM headed "Prestel Breached" in the December 6 issue said that on December 2 a group of hackers had broken into Micronet's sub information provider *Micromouse* leaving the message "Bring back Timefame — hack of the century". The article described this as a serious breach of security**

**In fact the Editor of the *Micromouse* database put on the message "Bring back Timefame *0181 # R A-OK" in connection with a story headed "The Ultimate Hack" screened on December 3 with the full knowledge of Micronet. There was no question of Micronet's security having been breached.**

# Tír na nÓg

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Tir Na Nog – a true computer movie.

ALSO FROM GARGOYLE
THE STUNNING SPACE GAME,
***AD ASTRA – £5.95***

## Atari

continued from page 1

gital Research's applications package, *Gem*, will be bundled with the machine

At the top of the range, Atari is developing a 32-bit work station for professional use, based on the National Semiconductor 3232 processor

The 8 and 16-bit machines will be shown at the Winter Consumer Electronics show in Las Vegas in January

"The redesign of the 800XL will be largely a rehousing job," said Jack Tramiel "It will be compatible with the existing version — indeed the whole 8-bit range will be compatible

"For the 16-bit machine, we have a number of peripherals lined up — disc drives with storage capacities of ¼ megabyte up to 20 megabytes on a hard disc drive, and four different printers.

"The 16-bit machine will not be compatible with IBM or Apple models. TOS is a proprietary operating system. I do not compete with IBM — I make PCs for the masses, and leave the business side to IBM."

Tramiel stressed that all the new machines were aimed at a mass market — a policy reflected in the provisional prices. The Atari 800XL is expected to remain at £129 and prices for the new 8-bit range will be comparable Atari plans to price the 16-bit at around £300 and the 32-bit at "below $1000", and thus under £900

All the new products will be available in the UK — around April for those launched at CES and June-July for the 32-bit workstation.

On the software side, Atari plans to develop further the role of Atarisoft. "Atarisoft has added a new line of products, and we want to develop Atari implementations of best-selling games. I'm also looking carefully at the pricing — and possible reductions to be made in January," said Tramiel.

"There will be a small software base for the 16-bit when it comes out, and Atari has access to the entire Digital Research library You can expect a number of languages such as Dr Logo, Pascal and Fortran to be available when the machine comes out."

Tramiel hopes that by the end of December Atari will have broken even — a sharp turnaround, as Atari was losing £10m per month when it was part of Warner Comms

He plans to raise further finance for the company through a private placement within the next few months, and intends Atari to go public next summer

Tramiel says he has now settled over 85% of creditors' claims outstanding when he took over Atari in June

## C16 in flight

ONE of the first releases for Commodore's new C16 computer is Craig Communications' *Flight 015*

Programmer John Wagstaff (see *Popular Computing Weekly*, October 11) has written an enhanced version of his original Vic 20 game The C16 version features five skill levels, a more sophisticated landing routine, and continuously up-dated status reports

*Flight 015* for the C16 is being released this week at £5.95

## A musical showing

MUSIC was the predominant theme at the Electron and BBC Micro User Show, held at the Royal Horticultural Society's Hall on December 6-9

Acorn's own Music 500 synthesiser for the BBC, launched a month ago at Compec was demonstrated as was a fully digital synthesiser, The Clef, from Computer Music Systems also for the BBC

The latter costs a hefty £495.00 for the full system comprising keyboard, PDSG tone generation system, power supply and software on disc.

Island Logic *Music System* is slightly different, being a software package to play or create tunes with just the micro, using on-screen icons for menu selection. *Music System* costs £24.95 on disc, and £12.95 on cassette

Slogger Advanced Systems showed its Rombox Rom expansion unit for the Electron, while Arisa Computers had a 20K BBC Ram expansion pack on view

# Letters

## Knocking spots off MSX

OK, so I have been forced to eat humble-pie Since writing to you in praise of the MSX concept I have to admit my opinion has undergone a complete reversal!

I have now had hands-on experience of many of these new machines, and they fall down in a number of very important respects

The keyboards on some of the machines are really quite terrible — very unresponsive, failing to register key-presses unless one is very careful. In some cases even the Spectrum's is better!

The picture quality produced by the MSX's is not as good as one was lead to believe The Spectrum knocks spots (or should I say pixels?) off them.

Also, I am amazed at the high quality of the new breed of games now coming on to the market for the existing machines *Lords of Midnight* was but a forerunner of some truly unbelievable programs — *Tir Na Nog*, *Deus ex Machina*, *Knight Lore* and *Swords and Sorcery*

These programs' complexity overcomes all my objections concerning the Spectrum, and make it by far the best buy on the market. It is difficult to see how the MSX companies can justify such high prices

*D A Austin*
*18 Stafford Avenue*
*Clayton*
*Newcastle-under-Lyme*
*Staffs ST5 3BN*

## Somewhat sceptical

The issue of November 18 carried a review by Bill Hoskins of our book *QL Assembly Language Programming* and we are rather unhappy about several of the points made in the review

The particular points are first, that the book is very similar to the *QL Advanced User Guide* and the *QDOS Manual* and retains "the same inaccuracies" We maintain that the points of similarity are only those which you would expect when books cover similar subjects, and that the treatment is completely different. The author, Colin Opie, wrote the book in consultation with Tony Tebby as Technical Adviser, and they are somewhat sceptical about your reviewer's qualifications to comment on technical accuracy

The expression "uncannily similar to those in the book's rival", would be thought by any fair-minded traveller on the Clapham Omnibus to mean at worst plagiarism and at least sharp practice. It is true that each book contains a clock program. They are, however, manifestly different; in our book it is an analogue clock which counts seconds, for example. The similarities in the program appear to us to be very superficial

Finally it is not true that our book is "more expensive" Both books are £12 95.

In general publishers accept comment and criticism, even when it expresses a reviewer's misconceptions and prejudices, however, we feel that that review goes beyond that and was in our view unfair

*Jeremy Dicks*
*Software Sales Manager*
*McGraw Hill Book Co*
*Shoppenhangers Road*
*Maidenhead*
*Berks*

***QL Assembly Language Programming* contains a number of inaccuracies which are found in Sinclair's *QDOS Manual*.**

**Sinclair itself has warned of possible errors in the preliminary *QDOS* manual.**

**A couple of examples: the *Edit Line* description is very misleading and the necessary method for turning the microdrives is not even mentioned.**

**The programs in the two books are substantially different and both books are priced at £12.95, but I have to say that I still prefer Adder's *Advanced User Guide*.**

**In my view the only additional technical material compared to the *QDOS Manual* in the McGraw-Hill book is the program listings themselves — Bill Hoskins.**

*Hold it, Sir!*

## A pleasant surprise

Re 'Dragon lives on' in your November 28 issue — I was pleasantly surprised to read your reply to M P Baker

All too often now it seems that computer software houses and magazines are only too ready to withdraw their support once a particular home computer becomes obsolete'

They seem to forget that the people being forgotten are the very same people who not so long ago supported them by buying their games and magazines.

Keep the Dragon articles flowing

*A E Standing*
*32 St David's Close*
*Iver Heath*
*Bucks*

## Freezing the QL

I'm not sure if many QL owners know this but, pressing *Control* and *F5* seems to freeze the computer It can then be unfrozen by pressing any key

This is useful because when you are listing a long program it can be stopped and started to view it easily

Even the Psion programs — a long *Quill* document, for example, can be stopped using the two keys.

*A J George*
*Kenmore*
*The Glen*
*Saundersfoot*
*Dyfed*

## Pleased for the Amstrad

I am greatly pleased to see your magazine has started printing articles and reviews for the Amstrad CPC464

*Owen Davies*
*Hill Cottage*
*Sutton Place*
*Abinger Hammer*
*Dorking*
*Surrey*

## Computer wilderness

*PCW* is clearly the most popular and heavily used magazine to which this school subscribes, so much so that we need two copies per week. However, despite its undoubted popularity with a substantial proportion of our 1677 students, aged 12-18, many express disappointment that the RML 380Z and RML 480Z computers seem only to be the subject of an occasional letter, usually from another teacher

No one could possibly expect a popular weekly magazine to be able to extend coverage to every single micro in use, but if one were to compile statistics reflecting micros used by, rather than bought by, children and young people, I suspect that the RML machines would rank very highly

An occasional mention of these machines would be justified and might even serve to enhance your sales to schools and young people Please help our young students to escape the feeling that their school computing is a sort of wilderness as far as the press is concerned.

*D R Schofield*
*School Librarian*
*The Ousedale School*
*Newport Pagnell*
*Bucks*

**The only reasons the Research machines are featured so rarely in these pages is simply that we are never sent programs to review for them, presumably because such software is exclusive to schools. Nor do our readers send us program listings for people to type in which run on them. We can only reflect what we are sent.**


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100% GRAPHIC EXPLORATION
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A game of distinction from British Telecom.
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# The BBC Micro is only 16" long. But it stretches indefinitely.

It stretches into schools where BBC Basic and the Econet networking system have helped make it Britain's number one

It's down at the doctor's, helping run the practice thanks to an ingenious program designed by two GPs. You'll catch it

It can take you to the theatre using its Prestel and Teletext adaptors. While helping out at the lab with its scientific monitoring interface. It has even been


educational computer. It's making life easier in the office, and has grown into the country's top micro for small businessmen.
on TV, the star of a series of computer literacy programmes. Its colour graphics and new Bitstik make it welcome in design studios.
working in space, tracking a satellite it also helped design.
Meanwhile, back on Earth at 19
The BBC Microcomputer System. The world's best.
And still growing.
The BBC Microcomputer System is designed, produced and distributed by Acorn Computers Ltd

# Gravitar

**Can you guide your ship safely through the galaxy in Gravitar for 48K Spectrum, by Jim Arovan**

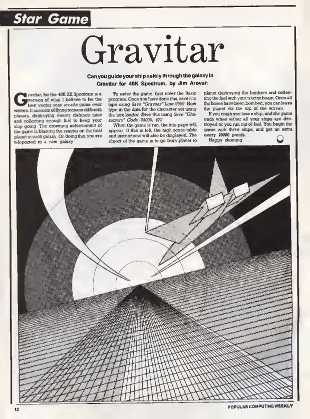
*Gravitar*, for the 48K ZX Spectrum is a version of what I believe to be the best vector scan arcade game ever written. It consists of flying to many different planets, destroying enemy defence sites and collecting enough fuel to keep your ship going. The crowning achievement of the game is blasting the reactor on the final planet in each galaxy. On doing this, you are teleported to a new galaxy.

To enter the game, first enter the Basic program. Once you have done this, save it to tape using *Save "Gravitar" Line 9999*. Now type in the data for the character set using the hex loader. Save this using *Save "Characters" Code 64000, 472*.

When the game is run, the title page will appear. If this is left, the high score table and instructions will also be displayed. The object of the game is to go from planet to planet destroying the bunkers and collecting the fuel with your tractor beam. Once all the bases have been bombed, you can leave the planet via the top of the screen.

If you crash you lose a ship, and the game ends when either all your ships are destroyed or you run out of fuel. You begin the game with three ships, and get an extra every 10000 points.

Happy shooting ...



```
[illegible]
1020 GO SUB 2000+(SCREEN-1)*50
[illegible]
1040 IF IN 64510-190 THEN LET XP
[illegible]
1050 IF IN 64510-189 THEN LET XP
[illegible]
1060 IF IN 57342-189 OR IN 57342
[illegible]
1070 IF (IN 57342-190 OR IN 5734
[illegible]
3060 PRINT AT 17,0; INK 2;
[illegible]
3065 PRINT AT 17,0; INK 2;
[illegible]
3070 LET SUM=2: LET BONUS=2000
[illegible]
3100 PRINT AT 12,0; INK 2;
[illegible]
3110 PRINT AT 14,0; INK 2;
[illegible]
3120 PRINT AT 18,0; INK 2;
[illegible]
3150 FOR X=1 TO 3: PRINT AT X,12
[illegible]
3155 FOR X=8 TO 10: PRINT AT X,5
[illegible]
3160 PRINT AT 11,0; INK 2;
[illegible]
3165 FOR X=14 TO 18: PRINT AT X,
[illegible]
```

[illegible]

```
 5 CLEAR 63999: LET a=18: LET
b=11: LET c=12: LET d=13: LET e=
14: LET f=15
 10 POKE 23609,0: FOR x=64180 T
O 64471
 15 INPUT STR$ x;a$
 17 IF LEN a$<>2 THEN BEEP .1,0: G
O TO 15
 20 PRINT x,a$: POKE x,VAL a$(1)
*16+VAL a$(2)
 25 NEXT x
```

The Hex Loader Program

[illegible]


Commodore 64
Officially Licensed from
BUG-BYTE
Bug-Byte Limited, Mulberry House, Canning Place, Liverpool L1 8JB Telephone: 051-709 7071.

# Oric's IQ test

*Christina Erskine talks to Bruce Everiss of Tansoft*

Bruce Everiss reminds me of Mi Micawber. He always turns up. His latest appearance has been in the role of managing director of Tansoft, the Cambridge-based company now owned by Oric directors Barry Muncaster and Paul Johnson. This follows a number of Bruce sightings as both a computer journalist and Yamaha's representative for the CX5 micro, since the demise of Imagine where he was operations director.

Bruce was appointed a month ago, following the departure of former Tansoft directors Paul Kaufman, Cathie Burrell and Geoff Philips.

His brief is not only to develop the software company, but to take charge of all Oric's marketing including three new machines due out early in the New Year. The successor to the Atmos, the IQ164, a portable model and an IBM Pc compatible machine.

"To talk of three new machines from Oric is a little misleading," said Bruce. "The new one is really the Pc-compatible series, for which we have designed the chips in house — we have a chip set for the Pc compatible that uses half the components normally used.

"Oric's Pc will actually consist of two machines, similar to the two Advance models. The basic micro will have a cassette interface and can be used as a home computer. However, we're looking at the possibility of waferdrives and quickdiscs for data storage."

The quickdisc is being considered as a cheap alternative to microdrives or more conventional disc drives. The mechanism is extremely simple, the 3½ inch disc rotated by a single motor, the head moving across from edge to centre on a plastic peg. Each one has a capacity of 64K per side. According to Bruce several Japanese companies are planning to introduce quickdiscs for machines in the UK.

"With the IBM Pc compatible version of the micro, we're looking at Winchesters and hard discs, of course."

The lap-held machine is not an Oric manufactured product, though Oric, through Barry Muncaster and Paul Johnson, have contributed to its design. "We also have a specific Local Area Network designed and ready to put into the machine." the machine is made by a US company and Oric is putting its name to it in the UK.

"This is definitely a machine aimed at the travelling company executive. You'll be able to load half a megabyte into Ram, it will have an 80 x 25 Hitachi screen display, so it's not aimed at the lower end of the market."

I wondered if it was being brought out deliberately before Sinclair launches its portable model. Bruce didn't seem to think Sinclair posed much of a problem.

"Sinclair's will be an inexpensive, simple machine — ours will be priced around £3000 and is a professional machine — after all the display alone costs £1000 to put in. It's going to be more in line with the Data General 1.

"And as for the launch of the new products, it may not be as originally planned, now that I've come in to co-ordinate the marketing. Remember, I'm still in my first month at Tansoft."

We talked about the IQ 164, the forthcoming home micro and follow up to the Atmos. "It will be a bigger machine than the Atmos, and much more powerful. The Microsoft Basic has been extended to include commands for 3D graphics and sound. The Atmos will continue in the marketplace where I see it in direct competition with, say, the Electron."

The IQ 164 contains custom ULAs to control video, Ram refresh, address decoding, memory paging, bus buffering and logic functions.

"The machine will have 64K Ram and while it has no internal Rom, there are two Rom cartridge slots on the upper right hand side of the keyboard for applications and language programs."

The language cartridge can contain up to 64K and the applications cartridge up to 48K. "A Basic cartridge will be bundled with the machine at launch, and Logo will also be available."

The IQ 164 will be heavily pushed in the European market, where Oric has had far more success than in the UK. It is set for launch in France, as the Stratos, before the UK launch.

Before the launch of new products, Bruce's first job is to build up Tansoft. "I need to get together a first class team of staff here. Then, it's a case of expanding the software base.

"My policy is to establish a large catalogue of software, both for the Oric and other machines, and then add to that catalogue very selectively with quality products and delete the ones that aren't doing so well. Although Tansoft has not produced software for machines other than the Oric models so far, I am happy to convert to and from the Atmos if there is a demand.

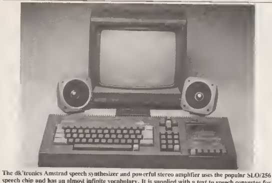
"I've recently bought the entire catalogue from Voyager Software — most of which are fairly run-of-the mill arcade games, but they've been modified and I'll use them all for Tansoft."

Bruce also had some interesting things to say about Oric manufacturing policies. "We're quite happy to let other companies test and define the market before we join in. If Sir Clive Sinclair finds a huge new market with the QL, then Oric will release its version of the machine. As the industry becomes more mature, we don't really want to take too many risks; we're more interested in making money."

**These list the enhanced software features of the IQ 164 over the Oric Atmos**

| | |
|---|---|
| Reaves | |
| Auto | |
| Ed | a modified screen editor |
| RS232 | used to define the parameter of the serial I/O channel |
| Slist | |
| Sprint | |
| Sinput | read serial input |
| Setfun | used to define the function of each key when combined with the Funct key. Basic single key entry |
| Gload | load game cartridge |
| Absdraw | |
| Move 3D | |
| Draw 3D | |
| Adraw 3D | |
| Dest 3D | |
| Paint | |
| Splat | |
| Ellipse | |
| Eval | a new string handling instruction |
| Gdir | game cartridge directory |
| Env | a new sound command to synthesise waveforms |
| Note | a new sound command |
| English | |
| French | |
| Delete | delete lines of programs in Basic |
| Ecload | new super cassette system |
| Xsave | |
| Xload | |
| Xstore | for modem communication to other Orics |
| Srecall | |
| Atmos | initialise IQ 164 to 100% compatibility with Oric Atmos |
| Lesave | |

# Amstrad Speech Synthesizer!



**The dk'tronics Amstrad speech synthesizer and powerful stereo amplifier uses the popular SLO/256 speech chip and has an almost infinite vocabulary. It is supplied with a text to speech converter for ease of speech output creation. Everything you wish to be spoken is entered in normal English, without special control codes or characters, it is therefore extremely easy to use. The voicing of the words is completely user transparent and the computer can carry on its normal running of a program while the speech chip is talking. The speech output from SLO/256 is mono and directed to both speakers.**
To utilise the Amstrad stereo output on the back of the computer, the interface has a built in stereo amplifier, this gives all sound output a totally new dimension and greatly improves the sound quality and volume over the computer's internal speaker
Although there are only 26 letters in the alphabet, letters have a totally different sound when used in different words For example. The "a" in Hay is much longer and softer that in Hat When you speak you automatically make adjustments because you know just how a word should sound Not quite so easy with a computer
After looking at other speech synthesizers we decided that it was essential that the dk'tronics Amstrad Speech would offer a simple system that would enable the user to produce realistic speech that was instantly recognisable

The solution to the problem was extremely complicated, it required hours of programming to enable the computer to look at the individual letters that make up each word and compare their relative position to each other before deciding on the appropriate sound.
I am delighted that we have now perfected what I consider to be the best Speech Synthesizer on the market, one which has achieved my aim, within the limitations of the allophones, of producing realistic speech.
**At only £39.95** the dk'tronics Amstrad Speech Synthesizer represents remarkable value for money
Available from department stores and good computer shops everywhere or direct from
**dk'tronics, Saffron Walden, Essex CB11 3AQ. 12PCW**
**Tel. (0799) 26350. Add £1.25 post and packing.**

# Multi-tasking

**Hardware** The XP memory expansion system **Price** £15 95 **Supplier** TV Services, Chesterton Mill, French's Road, Cambridge.

A four megabyte, multi-tasking Spectrum? If you can afford the Ram, that's one of the possibilities presented by the XP expansion board, which gives the facility to add up to 128 extra pages of memory, each of 32K.

The XP system comes in two parts the hardware has been developed by the ingenious Steven Adams, while Andy Pennell has written software that allows multi-tasking and windowing For £15 95 you receive the software and a ready built, three by one inch, circuit board which hosts five ICs, two resistors and a capacitor Fourteen wires need to be connected between the PCB and the computer some attaching to the board and others to IC pins. A certain amount of track cutting is also necessary

Although the instructions are reasonably clear, installing the kit is not a job for beginners, particularly as there are at least four types of Spectrum circuit board. Sending your machine away to have the board fitted only costs £5 extra (plus postage) which must be the bargain of the month.

The chips are standard TTL items — NOR gates and flip-flops — and are arranged to react as an I/O port. Bit 1 of the I/O address is all that is used in the decoding process the "official" address of the port is 253 There are three possible states that can be produced by writing data to the port Any value over 127 allows external Ram pages to occupy the top 32K of address space. 126 will enable the normal upper 32K, 127 selects another 32K block of Ram already contained onboard the Spectrum, although this last block may not be complete, or not even work at all.

Confused? What extra 32K am I talking about? The 48K Spectrum has two groups of Ram chips The addresses &H4000 to &H7FFF are serviced by a batch of 16K chips, while &H8000 upwards uses eight 32K bit ICs, which are in fact 64K bit chips that are faulty, with one or more duff bits in either the upper or lower half Sort these into batches of "high" and "low" and you have a supply of 32K bit Ram chips.

These were not always available, so some Spectrums were fitted with perfect 64K chips, while others may have quite a lot of usable "alternative" Ram The suggestion is that over half the machines fitted with the XP board have a decent amount of extra Ram.

The designer makes it clear that there are no guarantees; it is possible to fit 64K chips to ensure an additional internal bank of memory, but the main purpose of the XP circuitry is to keep the internal Ram refreshed while external Ram packs are switched into place. The first pack available will contain two 32K banks and cost under £100, while technically-minded Spectrum owners will be able to convert existing 32K extension packs to suit the system.

With the board fitted a Spectrum behaves just like any other providing you leave I/O port 253 alone. So far only one commercial program has been found to crash — one of the Ultimate games. To use extra banks, Ramtop must be lowered to &H7FFF, leaving you with a 16K Spectrum, otherwise switching off the normal page will cause Basic to lose its stack (a very sorry state of affairs).

You may be wondering how it is possible to benefit from the hardware; the answer lies in the software. This is supplied on cassette and loads into the non-switched Ram. It searches the external world for working pages and each one that it finds is set up so that it resembles the Basic program area You are then placed in the home page, with almost 32K available for programs and a number of extra commands at your disposal. These normally take the form of *Randomise Usr* statements, with any parameters following in a *Print* statement.

However, owners of an Interface 1 will find that extra command words have been created for their convenience It is possible to switch to another page (even an unusable one), *New* the current page and stop a program running in another page.

The most interesting commands allow multi-tasking and windowing *Multi 0* or its *Randomise* equivalent clears the multi-tasking Putting a *Multi* statement at the beginning of each page's program with a valid page number as a parameter will include that page as the next in the chain. You end the chain by giving the last page's number again. If you now run the first program all the programs in the chain will run. The software, running in interrupt mode 2, allows one program to run for a fixed period of time, followed by another, and so on. Certain operations pause the multi-tasking as they disable interrupts, such as *Beep* and cassette commands. *Input*, *Save* and error messages halt multi-tasking and it must be restarted. It's just as well that *Input* does — two input commands running at the same time would be rather awkward!

Windows are implemented with a command that has four parameters defining the top left corner of the window and its size Sinclair Basic programs take these as the limits for character (but not graphic) output, each page having its own window It can be argued that these are not "true" windows, as when they overlap neither covers up the other, and scrolling a large window will move the contents of any smaller windows within the area. The same argument applies to QL windows

Passing variables between programs is made possible because there is space in the lower section of memory which can be accessed by any program. A planned enhancement to the system will also allow Roms to be paged into memory

To get two programs running concurrently on the Spectrum is quite an achievement; the possibility of getting 32K of additional Ram, at a price of £20 95 (or £15 95 if you fancy your chances with the lot) make this one of the most exciting additions to the Spectrum to date

**Jeff Naylor**

*Spectrum fitted with XP memory expansion circuit board*

# HERE'S WHAT YOU'VE SAID.....

"The standard of the programme is far, far better than we were expecting" ALAN DAIRE.

"Eureka! is superb. It's marvellous to have computer software of such high standard from Ian Livingstone" CAROLE SKAIFE.

"It's taken over my life – I only have three hours sleep a night. I hated adventure games before this but Eureka! is brilliant!" ANONYMOUS CALLER.

"Congratulations on producing such an entertaining and stimulating package" J. GOODENOUGH.

"I would like to thank all involved for making such an interesting game, especially the riddles" NORMAN SCOTTER.

"Please, give me a clue to the £25,000" CHARLES COOPER. *(Sorry, Charles)*

"I hate this game. I seem to be missing all my favourite TV shows" ADAM BOWLES. *(Poor old Adam)*



# Safety in numbers

*Which MSX? **Jeff Naylor** separates the peas from the pod*



MSX certainly has its disadvantages. But it also has some good things going for it.

The current pricing structure for the Japanese micros is definitely a serious drawback but, that aside, the attractions of the system are considerable.

Using a Z80 CPU may be considered by some to be old hat, but there are plenty of programmers who can write software for it.

MSX may lack an 80-column display or very high resolution graphics, but the sprites that are available are easily manipulated from Basic to more than compensate the games programmer.

Extended Microsoft Basic may not have anything to offer the structured language enthusiast, but its sound and graphics commands, high precision arithmetic and interrupt structures make it a powerful language.

Value for money? At present that is certainly questionable. The quality of many of the machines goes some way to justify their price — blame the rest on a strong Yen. And, as long as you trust the companies to stick to their promises, the standardisation carrot is very attractive.

The MSX design standard is very well known now so I shan't go into much detail.

Nevertheless if you have got as far as thinking that you want to buy an MSX machine, then there are still decisions to be made. Although the machines are very similar, small differences in specification and manufacture allow distinctions to be drawn, some users will find use for an RGB socket, for example, while people intending to spend a good deal of time hammering away at a keyboard should examine it with care. If a computer is to invade the living room, then with the choice available there is no need to buy one that is aesthetically offensive either to you or the other inhabitants.

Collecting seven computers together and making judgements on their relative merits does involve personal opinions, particularly when they all share the same standard, so my comments concerning subjective matters such as styling and keyboards should be backed up with visits to computer stores.

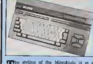
All the seven have 64K of Ram, on top of the 16K of video memory, but 32K machines have no less Ram available to Basic. To use the extra memory that lies under the Rom requires machine-code tricks, and I am not yet aware of any software that will not run on a 32K computer.

Neither the Yamaha nor Hitachi machines have been considered here. The Yamaha costs over £500 and comes with a music keyboard, the Hitachi is being sold as a portable business machine and is priced over £350.

Both are therefore pitched into slightly different areas of the market and cannot justifiably be compared directly with the other seven MSX micros.

Also, neither machine is likely to be available before next week.

## Mitsubishi ML F80 — £299



The styling of the Mitsubishi is in a decidedly high-tech vein — sleek and modern

The keyboard has not succumbed to the design however, being composed of normal keys the action of which is quite respectable Layout is pretty standard, the return key is fairly large and well placed, the shifts are of a good size, and the caps-lock has a built-in indicator light It is the function, editing and cursor controls which are a victim of the designer trying to achieve looks rather than ergonomics It is not their size and shape that is the problem, but their short action. Not quite as bad as some machines, maybe, but still poor

Inside the ML F80, the standard of construction is quite respectable. The power supply is small and efficient and the usual separate Pal TV encoder board is evident. There are two Rom slots available, the one at the rear doubling as an expansion bus connector Neither slot is guarded by a microswitch to cut off power when a cartridge is inserted, and the rear slot is rather wobbly As would seem sensible the slot on the top of the machine has priority over the rear port

## Sanyo MPC 100 — £299.95

Clothed in black and silver, with white legends on black keys, the styling of the Sanyo is simple and uncluttered. The layout and feel of the keyboard is very pleasant, I personally liked its Qwerty keys, and the special keys do not lag far behind. even the cursor keys are a good compromise between programming and games use The space bar is particularly wide and the caps lock key lights up

Construction is to a high standard, but one rather nasty bodge spoils an otherwise well made printed-circuit board — this may be unique to the review machine though. The standard video pcb found in other Japanese models goes one stage further and not only contains the modulator but also slots in place rather neatly The power supply is lightweight It is interesting to see — if rather pedantic — that the MPC 100 has a rated power consumption of 11 watts, whereas the Goldstar uses 20 and the Sony 24 watts The Sanyo will run for 90 hours, rather than about 50, on six pence worth of electricity!

There is only one Rom port, protected by a microswitch, so the expansion bus is of a "non-standard" variety A reset button is provided.

## Canon V-20 — £280

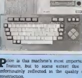
The Canon is a solid computer that sits firmly and purposefully on a desk, housed in a black, rounded case Unfortunately that is where the compliments stop as the effects of the stylist have left the machine with a decidedly plastic look which stems mainly from the design of the control keys Lying in a flush line across the top of the main keyboard they are ugly and ungainly in operation.

The cursor keys are worse virtually no travel makes them a pain to use, even for games, but they still rattle The Qwerty keys are much better, but still not as good as other machines. Even the space bar is too short.

The reason for the Canon's weight (a large mains transformer) has counter productive effects hold down a shift key and you become aware of a gentle vibration running up your arm. I suppose it makes the 'Power On' LED indicator redundant! Apart from the sub-station sized transformer the case houses a well produced pcb Back outside the case, you will find the joystick sockets well placed on the front edge, and two unprotected Rom ports

The side port doubles as the expansion socket and has priority of the top slot. This seems the wrong way round to me

## Goldstar FC 200 — £230



Price is this machine's most important feature, but to some extent this is unfortunately reflected in the quality of construction.

The FC 200 is very similar to the Toshiba HX-10 in terms of styling — simple and well proportioned but the most obvious difference lies in keyboard. This is not too well laid out, with keys such as *Ctrl* and *Code* unusually placed. The return key is the worst example — not only is it too small, but is sited so high up that it is hard to find.

The shift keys also suffer from being a little too small. The keys have a rather dead feel to them A problem exists with the lack of a pound symbol, there is one in the character set but not engraved on any of the keys

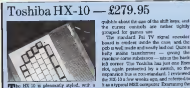
Inside, the impression that this computer was not built by a Japanese company — it is Korean — is perpetuated. Although perfectly acceptable, the printed-circuit board does not have that well-produced look of its Japanese counterparts Instead of the single 32K Rom used by the other MSX computers the Goldstar has two 16K Eproms which at least gives it a higher scrap value!

Slightly perturbing is the use of insulating tape, rather than rubber sleeving to shield the back of the mains switch.

The single Rom port is microswitch protected, and seemed stiff when inserting or trying to remove a cartridge Alongside is the machine's special feature — a hole proudly labelled 'Pen Holder'

Goldstar is not a member of the UK MSX working party, and when it released the FC200 it caused a stir, being priced almost £50 less than its nearest Japanese rival.

## Toshiba HX-10 — £279.95



The HX 10 is pleasantly styled, with a nicely produced case The keyboard is one of the best in terms of feel, while the layout produces no surprises You could quibble about the size of the shift keys, and the cursor controls are rather tightly grouped for games use

The standard Pal TV signal encoder board is evident inside the case, and the pcb is well made and neatly laid out Quite a hefty mains transformer — giving the machine some substance — sits in the back left corner The Toshiba has just one Rom slot, again protected by a switch, so the expansion bus is non-standard. I reviewed the HX-10 a few weeks ago, and referred to it as a typical MSX computer Examining the other available machines reinforces this opinion — it is well made, with no special features

## Sony HB-75 — £299

The Sony is the most purposeful looking of the computers.

With the case being mainly black, it has an air of quality and substance, despite being plastic The Qwerty keyboard leaves nothing to be desired — there are even pips on the F and J keys for touch typists — and the tactile qualities are first class It is a bit unfortunate though that the function and editing keys are so small, with a short action A reset switch is also placed on the top row and has a raised surround but Mr Clumsy still managed to hit it instead of back-space on one occasion. Cursor keys are well spaced but also suffer from a short throw

Shielding is evident inside the machine, although not to the same standard as the JVC The general quality of manufacture is very high, and a big mains transformer gives substance without vibrating Two Rom ports are provided, with the one on top having priority but neither are fitted with a microswitch, at least Sony have provided a warning sticker

An RGB socket is fitted to the back of the machine A further enhancement is a built-in Rom program that provides simple data handling — memos addresses and so on, in the form of a filing system This is menu driven and very easy to use When powered up without anything in the Rom slots you are presented with a menu for the data program that also allows you to access Basic.

## JVC HC-7 — £279

The designer of this computer was obviously told to produce something that looked futuristic.

The result looks like a hump-backed whale with the flight deck of the Starship Enterprise stuck on its back (which is not to say that it won't be to someone's taste) The keyboard has a rake and curve which may, or may not, help to speed up typing Apart from this the keys are well laid out and feel fine The function and editing keys are very sensible with *Stop* being placed out of harm's way

The JVC is not just well made Taking it apart is like breaking into Fort Knox. This computer has been built to meet US radio interference regulations so everything is shielded, from the power supply to the back of the keyboard. Because of the unusual styling, there is no Rom slot on top of the machine. One lurks at the back and the other, which has priority, is on the right-hand side Both are protected by microswitches

An additional connector is provided which supplies RGB signals, so connecting a monitor is possible, though the 40-column resolution of the MSX system is quite at home with an ordinary TV set.

## The Verdict

Now to put my head on the block — for what its worth, my personal assessment of the seven machines is:

1 Sony HB-75 *£299*
2 Sanyo MPC 100 *£299.95*
3 Toshiba HX-10 *£279.95*
4 Mitsubishi ML-F80 *£299*
5 JVC HC-7 *£279*
6 Goldstar FC 200 *£230*
7 Canon V-20 *£280*

I have assumed that the price factor is not as important as quality of construction — otherwise why buy an MSX — and so the Goldstar doesn't feature in the top five

The Sanyo might have made it to first place if not for the Sony's built-in data handling program, while the JVC loses out because I personally didn't care for its styling I offer no excuses for putting the Canon last — I just didn't like it as much. It didn't feel quite right

The only quesiton remaining is, if Nissan bring out an MSX machine, will it have a cigar lighter as standard?



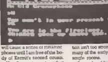
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## Lateral

**Program** *The Witch's Cauldron* **Price** £5.95 **Micro** Spectrum 48K **Supplier** Mikro-Gen, 44 The Broadway, Bracknell, Berks

In my time as an adventurer I've been many things — brave warrior, magical elf, even Denis Thatcher, but to start life as a toad...

Of course I never wanted to be a toad, but that's what comes of messing with Witch Hazel. So I strive to cast spells which will cause a series of metamorphoses until I am free of the body of Kermit's second cousin.



Now I'm a cat — not purrfect but I'm feline better. This form opens up more possibilities, too. However, I can't get through those small holes that I could a minute ago. I should have planned ahead.

Planning ahead is an integral part of this graphic adventure, and you'll need to be capable of lateral thinking to the nth degree. It's tricky and witty, frustrating and fun. Responses are fast as you'd expect and there's a good keyboard 'Beep'.

Though the written descriptions are rather thin, each scene has a very satisfying illustration, with your figure placed in position — nice to see I was a handsome toad at least! The usual feeling of N-S-E-W location block construction isn't too strong either with many of the early stages set in single rooms.

A novel and highly entertaining adventure.

**John Minson**

## A myth

**Program** *Orpheus in the Underworld* **Micro** Commodore 64 **Price** £7.95 **Supplier** Sterling Software, Garfield House, 86/88 Edgeware Road, London W2.

The success of Activision's *Pitfall* has given rise to a number of imitators most obviously Microdeal's *Cuthbert in the Jungle*.

Some of the same ideas have found their way into *Orpeus in the Underworld* from Sterling Software — but this time with a mythological setting.

The format of the game is very much as before. The objective is to collect various jewels, treasure chests and the like which are distributed over 120 screens, while avoiding the hazards. These take the form of rolling boulders, tar pits, deadly multi-headed serpents, etc. Some of the tar pits have the nasty habit of opening up under your feet as you try to run across the screen.

Those of you familiar with the earlier games will recognise all of these features. The similarity continues — there are also some underground passages which contain more treasures and hazards.

If you enjoy the *Pitfall*-style game you will probably like this too — and the graphics are quite interesting. It's hardly very original though.

**Richard Cosfield**

## Accurate

**Program** *Number Painter* **Price** £8.95 **Micro** Amstrad CPC 464 **Supplier** ASK London House, 58 Upper Richmond Road, London SW15

The principal reasons for using a micro as an educational medium is that the programs can be tailored to react to the user in proportion to the rate of learning and also that the colourful graphics and attractive sound can be used as an 'attention grabber' and a 'reward' to encourage the child to keep on trying.

Unfortunately a lot of companies seem to fail to realise that your average 12 year old has almost inevitably spent hours playing the most advanced games on the computer and is in fact highly discerning when it comes to quality of programming.

Jerky, slow, dull and uninspired graphics are surely even more off-putting than usual when burdened with the label of 'educational software'. Just as well then that ASK's programming and presentation is faultless. Fast and accurate mental arithmetic is tested against an arcade format somewhat similar to the *Panic* computer game. You have a reasonably tight timespan within which to climb ladders up and down platforms collecting numbers which are used to divide, multiply, subtract and add together to reach a predetermined target number.

The lowest levels are encouragingly easy and should suit most five year-olds whilst the highest levels can be very hard indeed so there is a real progression in ability. To confirm this there is an enclosed self test routine to measure any improvement in your performance.

What makes it a winner also is the fact that the 'gameplay' is slick, challenging and enjoyable enough to make it a medicine that is very easy to swallow.

**Tony Kendle**

## Detailed

**Program** *Battlecars* **Price** £7 95 **Micro** Spectrum 48K **Supplier** Games Workshop, 27/29 Sunbeam Road, London NW10 6JP

This is one of three releases from the pepole most usually associated with Fantasy Role Playing Games such as Dungeons and Dragons Indeed, *Battlecars* is directly taken from a series of FRPs of the same name It is, therefore, no surprise that the amount of thought that has gone into the actual gameplay is tremendous

The documentation is very slick and reading the booklet gives an indication of the character and atmosphere that makes role playing games so popular

On loading the game initial impressions are also favourable The two cars, your's and a friend's, or your's and the computer's, are each given a display window showing their local surroundings from above There is also a map of the whole playing area showing relative positions, it looks like Ultimate's *Trans Am* with more detailed landscapes Unfortunately, the similarity ends there Of the three releases only *Battlecars* desperately needed to be a fast, smooth scrolling game — instead the cars creak along with slow character square movement which ruins everything.

You are given good value with over 90K of code split into sections such as a car designer module and three game settings The first is a complex race circuit where you can challenge the clock, a friend or the computer The second screen is an open combat arena, but the computer plays its part here too The game really comes into its own as a two-player game and the last module 'the city', is by far the most exciting

Unfortunately, unless it is recorded, which would make it brilliant, the game will only appeal to the limited two-player market.

**Tony Kendle**

## Tester

**Program** *Estimator Racer* **Price** £4 95 **Micro** Spectrum 16K **Supplier** Sinclair Research, Stanhope Road, Camberley, Surrey GU15 3PS

I've always been sceptical about 'educational arcade' programs Often they're just a little maths tacked onto an outdated shooting game. But Psion's reputation is outstanding, and with Applied Systems knowledge they've produced this mental arithmetic tester

*Estimator Racer* is a simple *Pole Position* with sums Steer your car across the four numbered lanes of the track choosing the one with the figure closest to the answer to the question below Every half kilometre you either continue if correct or stall, losing valuable time, if not.

To complicate things, the second section adds oil slicks which cause skids and jumble the lane numbers. Rocks then cause further stalls, while the night rally finale makes you cross all the lanes to illuminate their values.

I found this all genuinely exciting Trying to calculate without having to decelerate while avoiding additional hazards keeps you thinking under pressure In fact recognising an approximate answer is often more valuable than producing a slower, more precise solution.

The program has four skill levels (faster cars, more difficult questions), a choice of sums, plus practice and demo modes. I can't praise it too highly and there are many adults who would enjoy and benefit from it. **John Minson**

## To scale

**Program** *Geography — environmental studies* **Micro** Spectrum **Price** £8 95 **Supplier** Scisoft, 6 Minister Gardens, Newthorpe, Eastwood, Nottingham.

Too often the word 'educational' has been used as a way of conning the public or schools into buying software of little interest and even less educational value

Not so with this package which combines four separate programs each containing a number of different activities.

The set of programs is accompanied with a booklet describing the programs and a suggested method of use is included for any poor teachers too exhausted to work out their own.

Quality has not been sacrificed for quantity — the 'modules' are interesting and include a simulation using the spread of disease amongst trees as the model, a data base program containing information about all the major countries of the world and two games. Both of these set clear objectives and utilise skills of map reading, using scale, making decisions, etc, in the search for fun (and learning)

All the programs are based on good ideas, fast efficient programing, lively colourful presentation and achieve sensible educational goals.

On the cover it says "approved by teachers" It should have said "approved by kids" as well.

**Chris Stoneham**

## Random

**Program** *QL Forth* **Price** £23 95 **Micro** (Version AH and above) **Supplier** Computer One, Science Park, Milton Road, Cambridge

The first and most important fact about this version of the Forth language is that it is a full implementation of the Forth 83 standard and not the old Fig 79 standard version found on most computers.

This means that there are a great number of improvements as well as the additions to make use of the QL's power and hardware

Even with the limitations of the microdrives, this version allows random access files as well as sequential files to be used. You may also multi task up to ten other Forth programs while running one main program. To go with the Forth there are two software overlays — the first is a powerful editor and the second is a Forth dictionary These are overlays as the system works within 64K of which 20K is taken up by the Forth itself, so leaving 44K for programs Thus memory limitation is on real problem as few people write programs over 44K in length.

The manual supplied is most useful and gives all the information on the additions that have been made to the version Forth. Of the 70 pages 40 cover the 'word' set while the rest deals with using the editor and assembler

**Roger Thomas**

## Overtime

**Program** *Payroll Plus 64* **Price** £97.75 **Micro** Commodore 64 with disc drive **Supplier** Landsoft

Landsoft, a company primarily concerned with specialised business packages, has produced a payroll package for the Commodore 64 in common with all pre-programmed payroll packages it conforms with the Inland Revenue requirements for computerised payroll records.

While most software support for the C64 has been fairly and squarely in the games arena, a number of companies do produce business material for the 64 and it is a simple task to build a full accounting system. Operating a business on a 64 system — ie, micro, disc drive and printer — requires a considerable amount of manual dexterity. To accommodate all the necessary functions a library of pre-programmed and file discs must be manipulated. A double disc drive eases matters but does not eradicate the problem.

Once the difficulties of tending to the disc library had been overcome and the payroll package loaded, the program proved to be neat and reliable.

*Payroll 64* is menu-driven and passworded to ensure security. The first stage is to input basic employee information. This is drawn from normal P45 information plus departmental status etc, not unlike the employee record cards in a manual system.

The employee files allow for pre-set adjustments — two pre-tax and two after tax. At any point of payment a further three pre and after tax adjustments are made available. Three overtime rates can be shown and pre-set. It is highly unlikely, however, that in a small operation these facilities would be fully utilised.

The employee may be shown as hourly, weekly or monthly — in the first two cases the rate must be input per week or hour. In the last case the annual salary is sufficient and the program will make the splits for you at the point of payment.

As each payment period ends, information on overtime worked and any adjustments are easily added, the program automatically updates the files and a payslip can be produced. The payslips are printed in duplicate side by side, so perforated paper is a must. Payslip print outs can be obtained after each employee entry, by selection, or as a continuous run. Up to 100 employees can be administered.

After each entry sequence (weekly/monthly) an analysis of pay, national insurance, tax etc, is available. It is easily understood and provides a suitable base for nominal postings. Information for the purposes of completing form P35 is readily accessible and the end of tax year routine is a simple operation.

The program does not cater for statutory sick pay rules which could prove problematic, though, to be fair, programs covering this subject are cumbersome and difficult to manage.

On the whole, I found the program simple and accurate, but I cannot help wondering where its intended user base is. Small businesses running solely a Commodore 64 cannot be thick on the ground.

One can imagine a new company using a C64 already in one executive's possession, or the case of a business wishing to hold its payroll information totally separate to its main accounting function. In this case, it seems a reasonable buy.

At £97.95, the price is a little on the high side. A facility is also given for an update service at £23 per annum — a necessary addition to cope with the vagaries of the Inland Revenue.

**Robert Weir**

## Ice-flow

**Program** *The Perils of Percival Penguin* **Price** £6.95-£8.00 **Micro** BBC B **Supplier** Willowsoft, The Willows, Wrington Lane, Congresbury, Bristol.

No, this is NOT Pengo! You are a daddy penguin who having sat on the eggs for ages now tries to cross the Antarctic ice to the sea. You face hazards like ice-slides, attacking gulls, zooming seals and deep crevasses filled with weird monsters mutated by radiation.

To maintain energy you must eat the fish dropped by your mate on her way back from the sea to relieve you. You'll need that energy! Each screen must be completed within a day or lose a life.

The graphics are good and the action quite smooth. There is a musical accompaniment which you can turn up or down from the keyboard. Michael Legg is credited with the game and he's done a fine job. The cassette liner includes plenty of helpful hints on how to tackle each stage of the game.

There are similarities to the *Manic Miner* school of games but this is more ecologically sound!

**Dave Watterson**

## Thermal

**Program** *Doomdark's Revenge* **Price** £9.95 **Micro** Spectrum 48K **Supplier** Beyond, Competition House, Farndon Road, Market Harborough, Leicester

In *Lords of Midnight* Beyond hit upon a highly inventive approach to strategy games. Using a technique they called 'landscaping' and a vast number of single key press commands they let the player view the landscape through the eyes of various allied characters as they massed armies and recruited new warriors.

Fans of the *Lords* and there are many will already have packed their thermal vests to venture north to rescue Morkin, son of Luxor, who is held by Shareth the Heartstealer. Actually this is the least of the quests, for Tarithel, Morkin's lover, also rides north, and is in need of help herself, and if Shareth can only be beaten then peace may finally reign.

This has added complexity, but thankfully the clarity of the instructions and a handy overlay keep things in hand. The quest is saved from being a mere exercise in button pushing by the accompanying history this leads up to the events, and gives them an epic feel. When I sadly lost Tarithel I actually mourned his heroic passing.

Every byte of the Spectrum has been used, resulting in the absence of a reset routine to return to the start. This unfortunate omission is rectified by Saving the game early, so you can reload if all else fails.

In the time available, this review cannot begin to do *Doomdark's Revenge* justice. All I can say is that I'm hooked and can't wait to return to it.

**John Minson**



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# Bytes get munched

*The mystery of the missing Ram passed to QL users*
*by* ***David Nowotnik***

In the section marked *Qdos* in the concepts part of the QL manual you'll find a memory map of the QL, and the main system variables which define where in Ram various items are stored. The addresses of these variables (in the *JM* version, at least) are those shown below:

| | |
|---|---|
| SV_Heap | 163844 |
| SV_Free | 163852 |
| SV_Basic | 163856 |
| SV_Trnsp | 163860 |
| Sv_Respr | 163868 |
| SV_Ramt | 163872 |

These variables take up four bytes each, that is, to obtain their value, you have to *Peek L*, ie, *Print Peek L (163856)* will give you the start address of the Basic storage area in Ram. Taking the difference between values of variables will give you the amount of space taken up by different systems within Ram.

For example (1) *Peek L (163860)* — *Peek L (163856)* gives you the amount of space taken up by the Basic program (excluding procedures and functions, which are stored in the procedures area) (2) *Peek L (163856)* — *Peek L (163852)* provides the amount of unallocated Ram.

By playing around with these systems variables, you can start to find out how a lot of space is wasted in Ram, and some bugs that exist in QL's final Rom, the *JM* version.

When you first power-up the QL (or press reset), and print the result of expression 1 (the size of Basic), you get 4096 bytes — *yet no program exists in this area!* I loaded a program which I calculated to be about 14K bytes long (it occupied 33 sectors on a microdrive cartridge, assuming 95K per cartridge and 221 sectors, this makes 33 sectors = 14K). Printing expression 1 (as a direct command) after loading gives 26624 bytes, almost twice the space is allocated to *this* program than should be required.

Try renumbering a program, and you'll find even more space is gobbled up than originally used by the program.

Here's another quirk, try program one.

*Run* the program immediately after loading or typing into your QL. *x* is given the value of the *SV_Basic* system variable, the start of Basic, and is printed on the screen on each circuit of the loop. I found that after every 12 circuits of the *Repeat* loop the value of *x* dropped by 512 bytes; that is, for some unknown reason, more space was being allocated to *Basic*. Eventually, I got an out of memory error message — for a nine line Basic program! Not only that, but the computer failed to respond to any direct command (even *New*), and I had to press *Reset* (awfully useful that button!) to regain control.

Even stranger was the fact that if I stopped the program by pressing space, then re-*Run* the program, the variable *x* changed only occasionally in value.

The program I gave here is not just a curiosity; a friend recently used his QL at a swimming meeting to provide an instant results service. To everyone's annoyance, the program crashed out with an 'out of memory' message and the results service become far from instant. We found the fault to be when opening a channel to *Ser1* (the printer). Every so often, *Open* (or use of the channel) caused *SV Basic* to drop, so eventually he ran out of memory.

90K plus of user Ram on the QL may sound vast compared with most other home micros. But, the QL seems to waste a great deal of that space, and lose a lot through very serious errors in Rom. The 'JM' version of Rom has been described as the final version — I hope not, for it seems the QL will be useless with many long Basic programs if they are destined to crash out from the bugs in Rom.

**Program one**

```
5 t=3
10 REPeat loop
20 x=PEEK_L(163856)
30 OPEN £t,ser1
40 PRINT x
50 CLOSE £t
60 t=t+1
65 IF INKEY$(0)=""
THEN EXIT loop
70 END REP loop
```

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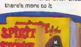
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# Light Fantastic

*This week a sneak preview of Llamasoft's latest program — Psychedelia — written and conceived by* ***Jeff Minter***

Jeff Minter's new program *Psychedelia* is going to come as something of a surprise to those expecting another fast-blast action game. In an industry that uses phrases such as 'innovative', 'unique', and 'totally original', with the abandon usually reserved for confetti at weddings, he has produced something that actually is a little different.

Jeff calls it a Light Synthesiser and that is a fair enough description. If you've ever been to a laser light show you may find it easier to visualise if you imagine yourself at the controls of one of those machines. Listen to your favourite track on your stereo while you create a kaleidoscope of swirling and changing colours on your TV. This roughly speaking is what *Psychedelia* is all about.

The concept is quite simple. You control an on-screen cursor with a joystick. On pressing *Fire*, a particular shape is plotted, 'decaying' eventually back to black through different colours with time. If the joystick is moved while the fire button is held down, the shape is continually replotted, leaving a trail of changing colour.

It is difficult to do the program justice in words, so this week we present a short version of Jeff's original idea that sparked the whole thing off.

We emphasise, this is just a taster of the main program. *Psychedelia* itself is considerably more complex with many pre-set shapes. It allows you to create your own. You can change the colour decay sequence of the 'trail', as well as its band width and pulse length. Stored sequences can be recalled on-screen and used as a background for more real-time creations.

However, the full-blown *Psychedelia* program will not be available (versions for the C64 C16 and Vic 20) from Llamasoft until December, price £7.50 for the 64, £6.00 for the others.

Until then, type in the Basic listing (paying special note to Lines 30 and 40 before you start), plug in the joystick, turn up your hi-fi and play that TV.

```
10 REM *** AJEFF MINTER PRODUCTION ***
20 REM *** BASIC PROG. BY KEVIN BERGIN
***
30 REM *** ENTER THE FOLLOWING IN DIREC
T MODE BEFORE YOU START'' ***
40 REM *** POKE 43,1:POKE 44,64:POKE 16
384,0:CLR:NEW ***
50 PRINT"  HANG ON A SEC....."
60 POKE53281,0:POKE53280,0:FORA=2049TO3
457
70 READX:J=J+X:POKEA,X
80 NEXT:IFJ<>98035THEN180
90 PRINT"  WONDERFUL COLOURS COMING...'
100 PRINT"  BUT FIRST HAVE YOU SAVED T
HIS ?"
110 GETA$:IFA$<>"Y"ANDA$<>"N"THEN110
120 IFA$="N"THENPRINT"  SAVE IT NOW TH
EN":STOP
130 PRINT"  TO SAVE THE CODE":PRINT"
 PRESS RUN/STOP & RESTORE"
140 PRINT"  THEN SAVE AS NORMAL (THAT
IS AFTER YOU  EXIT THIS PROG
150 POKE198,0:PRINT"  PRESS A KEY TO S
TART.':WAIT198,1
160 PRINT"  CLR:NEW":PRINT"  P 43,1:P
 44,0":PRINT"  RUN";CHR$(19)
170 POKE631,13:POKE632,13:POKE633,13:PO
KE198,3:END
180 PRINT'  DATA ERROR TRY AGAIN''":STO
P
190 DATA11,8,10,0,158,50,48
200 DATA54,52,0,0,0,0,0
210 DATA0,169,64,133,252,169,0
220 DATA133,254,169,0,133,251,169
230 DATA53,133,253,160,0,162,6
240 DATA177,253,145,251,136,208,249
250 DATA230,252,230,254,202,208,242
260 DATA76,0,64,169,0,141,32
270 DATA208,141,33,208,169,216,133
280 DATA252,169,0,133,251,162,0
290 DATA165,252,157,96,3,165,251
300 DATA157,64,3,24,105,40,133
310 DATA251,165,252,105,0,133,252
320 DATA232,224,25,208,238,32,40
330 DATA69,76,238,66,162,0,169
340 DATA207,157,0,4,157,0,5
350 DATA157,0,6,157,0,7,169
360 DATA0,157,0,216,157,0,217
370 DATA157,0,218,157,0,219,202
380 DATA208,225,96,0,6,2,4
390 DATA5,3,7,1,166,3,189
400 DATA64,3,133,5,189,96,3
410 DATA133,6,164,2,96,165,2
420 DATA41,128,208,249,165,2,201
430 DATA40,16,243,165,3,41,128
440 DATA208,237,165,3,201,24,16
450 DATA231,32,92,64,177,5,41
460 DATA7,162,0,221,84,64,240
470 DATA5,232,224,8,208,246,138
480 DATA133,253,166,4,232,228,253
490 DATA240,3,16,1,96,166,4
500 DATA189,84,64,145,5,96,32
510 DATA86,65,160,0,165,4,201
520 DATA7,208,1,96,169,7,141
530 DATA76,65,165,2,133,8,165
540 DATA3,133,9,165,8,24,121
550 DATA254,64,133,2,165,9,24
560 DATA121,37,65,133,3,152,72
570 DATA32,86,65,104,168,200,185
580 DATA254,64,201,85,208,225,206
590 DATA76,65,173,76,65,197,4
600 DATA240,8,201,1,240,4,208
610 DATA76,196,64,165,8,133,2
620 DATA165,9,133,3,96,0,1
630 DATA1,1,0,255,255,255,85
640 DATA0,2,0,254,85,0,3
650 DATA0,253,85,0,4,0,252
660 DATA85,255,1,5,5,1,255
670 DATA251,251,85,0,7,0,249
680 DATA85,85,255,255,0,1,1
690 DATA1,0,255,85,254,0,2
700 DATA0,85,253,0,3,0,85
710 DATA252,0,4,0,85,251,251
720 DATA255,1,5,5,1,255,85
730 DATA249,0,7,0,85,85,1
740 DATA189,153,225,238,78,65,96
750 DATA0,0,165,2,72,165,3
760 DATA72,32,107,64,173,149,65
770 DATA208,8,104,133,3,104,133
780 DATA2,96,96,169,40,56,229
790 DATA2,133,2,32,107,64,173
800 DATA149,65,201,1,240,231,169
810 DATA24,56,229,3,133,3,32
820 DATA107,64,104,168,104,133,2
830 DATA152,72,32,107,64,104,133
840 DATA3,96,1,15,14,13,12
850 DATA11,10,9,4,5,6,7
860 DATA8,9,10,11,12,13,14
870 DATA15,16,17,18,19,20,21
880 DATA22,23,20,19,18,17,16
890 DATA0,0,0,0,0,0,0
900 DATA0,0,0,0,0,0,0
```

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# Commodore 64

```
910 DATA0,0,0,0,0,0,0
920 DATA0,0,0,0,0,0,0
930 DATA0,0,0,0,12,13,14
940 DATA15,15,15,14,4,4,4
950 DATA4,4,4,4,4,5,6
960 DATA7,8,9,10,11,12,13
970 DATA13,13,13,7,8,9,10
980 DATA11,0,0,0,0,0,0
990 DATA0,0,0,0,0,0,0
1000 DATA0,0,0,0,0,0,0
1010 DATA0,0,0,0,0,0,0
1020 DATA0,0,0,0,0,255,255
1030 DATA255,255,255,255,255,255,255
1040 DATA255,255,255,255,255,255,255
1050 DATA255,255,255,255,255,255,255
1060 DATA255,255,255,255,255,255,255
1070 DATA255,255,0,0,0,0,0
1080 DATA0,0,0,0,0,0,0
1090 DATA0,0,0,0,0,0,0
1100 DATA0,0,0,0,0,0,0
1110 DATA0,0,0,0,0,0,12
1120 DATA12,12,12,12,12,12,12
1130 DATA12,12,12,12,12,12,12
1140 DATA12,12,12,12,12,12,12
1150 DATA12,12,12,12,12,12,12
1160 DATA12,12,12,0,0,0,0
1170 DATA0,0,0,0,0,0,0
1180 DATA0,0,0,0,0,0,0
1190 DATA0,0,0,0,0,0,0
1200 DATA0,0,0,0,0,0,0
1210 DATA4,7,1,2,3,6,7
1220 DATA6,12,2,3,6,7,1
1230 DATA2,2,4,4,7,1,2
1240 DATA3,6,7,12,2,3,2
1250 DATA3,7,1,2,0,0,0
1260 DATA0,0,0,0,0,0,0
1270 DATA0,0,0,0,0,0,0
1280 DATA0,0,0,0,0,0,0
1290 DATA0,0,0,0,0,0,0
1300 DATA0,162,0,138,157,150,65
1310 DATA157,214,65,157,22,66,157
1320 DATA86,66,157,150,66,232,224
1330 DATA64,208,236,96,32,214,66
1340 DATA32,44,67,238,43,67,173
1350 DATA43,67,45,53,68,141,43
1360 DATA67,170,222,150,66,208,34
1370 DATA189,86,66,157,150,66,189
1380 DATA22,66,201,255,240,21,133
1390 DATA4,189,150,65,133,2,189
1400 DATA214,65,133,3,32,171,64
1410 DATA174,43,67,222,22,66,76
1420 DATA244,66,0,120,169,75,141
1430 DATA20,3,169,67,141,21,3
1440 DATA169,10,141,50,68,141,51
1450 DATA68,169,1,141,21,208,141
1460 DATA39,208,88,96,1,0,206
1470 DATA73,67,240,3,76,49,234
1480 DATA169,2,141,73,67,169,0
1490 DATA133,12,32,42,68,173,0
1500 DATA220,41,3,201,3,240,37
1510 DATA201,2,240,6,238,51,68
1520 DATA238,51,68,206,51,68,173
1530 DATA51,68,201,255,208,8,169
1540 DATA23,141,51,68,76,141,67
1550 DATA201,24,208,5,169,0,141
1560 DATA51,68,173,0,220,41,12
1570 DATA201,12,240,37,201,8,240
1580 DATA6,238,50,68,238,50,68
1590 DATA206,50,68,173,50,68,201
1600 DATA255,208,8,169,39,141,50
1610 DATA68,76,187,67,201,40,208
1620 DATA5,169,0,141,50,68,173
1630 DATA0,220,41,16,240,8,169
1640 DATA0,141,54,68,76,5,68
1650 DATA173,53,68,240,8,173,54
1660 DATA68,208,49,238,54,68,238
1670 DATA52,68,173,52,68,45,53
1680 DATA68,141,52,68,170,189,22
1690 DATA66,201,255,208,26,173,50
1700 DATA68,157,150,65,173,51,68
1710 DATA157,214,65,169,7,157,22
1720 DATA66,173,56,68,157,86,66
1730 DATA157,150,66,32,25,68,177
1740 DATA10,41,7,141,74,67,169
1750 DATA1,133,12,32,42,68,76
1760 DATA49,234,174,51,68,189,64
1770 DATA3,133,10,169,96,3,133
1780 DATA11,172,50,68,96,32,25
1790 DATA68,165,12,145,10,96,30
1800 DATA13,26,31,0,0,12,0
1810 DATA0,0,0,0,0,0,91
1820 DATA0,0,0,0,0,0,0
1830 DATA0,0,0,0,0,0,0
1840 DATA0,0,0,0,0,0,0
1850 DATA0,0,0,0,0,0,0
1860 DATA0,0,0,0,0,0,0
1870 DATA0,0,0,0,255,0,0
1880 DATA0,0,0,0,0,0,0
1890 DATA0,0,0,0,0,0,0
1900 DATA0,0,0,0,0,0,0
1910 DATA0,0,0,0,0,0,0
1920 DATA0,0,0,0,0,0,0
1930 DATA0,0,0,0,0,0,0
1940 DATA0,0,0,0,0,0,0
1950 DATA0,0,0,0,0,0,0
1960 DATA0,0,0,0,0,0,0
1970 DATA0,0,0,0,0,0,0
1980 DATA0,0,0,0,0,0,0
1990 DATA0,0,0,0,0,0,0
2000 DATA0,0,0,0,0,0,0
2010 DATA0,0,0,0,0,0,0
2020 DATA0,0,0,0,0,0,0
2030 DATA0,0,0,0,0,0,0
2040 DATA0,0,0,0,0,0,0
2050 DATA0,0,0,0,0,0,0 2060 DATA0,0,0,0,0,0,
2070 DATA0,0,0,0,0,0,0 2080 DATA0,0,0,0,0,0,
2090 DATA0,0,16,19,25,3,0 2100 DATA5,4,5,12,
2110 DATA46,46,1,32,6,15,18
2120 DATA5,20,1,19,20,5,32
2130 DATA2,25,32,18,5,6,6
2140 DATA32,13,9,14,20,5,18
2150 DATA32,58,64,162,40,189,255
2160 DATA68,157,191,7,169,12,157
2170 DATA191,219,202,208,242,96,0
2180 DATA0,0,191,0,157,0,255
2190 DATA0,255,0,255,0,255,0
2200 DATA223,255,255,255,255,0,255
```

# BBC & Electron

# Put to the test

*It's never too early to start revising for those exams with Biology Quiz for the BBC B by* ***Simon Pithers***

This program tests the user to CSE & GCE levels, and contains 22 sample questions, although in a school environment a very much larger number of questions could be built up.

There is enough memory left in Mode 7 for another 150 long questions, alternatively enough room for 250-300 small to medium sized ones (this refers to questions put in the data form as in the program).

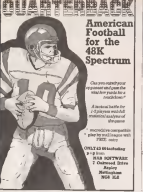
If an even larger catalogue of questions was required, then a disc database could quite easily be added to the program. A disc with 100K would give about 1200 questions. Therefore, a double-sided double density 80 track dual system would give a staggering 19200 large questions, which should satisfy any Biology department! If adding more data, then change line 170 to the new amount of questions.

This is the way the data is set out:
"Question"
"1st Choice", "2nd Choice", "3rd Choice", "4th Choice"
"Real Answer A, B, C, D", "revision topic"

When the computer suggests revision topics it puts itself into page mode, so press Shift to scroll the screen upwards.

```
10 REM ****************
20 REM * BIOLOGY QUIZ *
30 REM * By Simon ... *
40 REM * (C) 1984     *
50 REM ****************
60
70
80 MODE 7
90 VDU 23;8202;0;0;0;
100 *KEY 10 O.|MRUN|M
110 ON ERROR RUN
120 PROCtitle
130 CLS
140 DIM A0$(300),A1$(300),A2$(300),A3$(300),A4$(300),A5$(300),A6$(300)
150 DIM CE%(300)
160 R$="":C%=0:W%=0:C1%=0
170 FOR X%=1 TO 22
180   READ B0$(X%),A1$(X%),A2$(X%),A3$(X%),B0$(X%),A5$(X%),A6$(X%)
190   NEXT
200 FOR X%=1 TO DN
210   CLS
220   PRINT TAB(7)+CHR$141+CHR$157+CHR$129+"Biology Questions  "+CHR$156
230   PRINT TAB(7)+CHR$141+CHR$157+CHR$129+"Biology Questions  "+CHR$156
240   Q%=RND(22)
250   C1%=0
260   FOR Y%=1 TO 22
270     IF CE%(Y%)=Q% THEN C1%=1
280     NEXT
290   IF C1%=1 THEN 240
300   PRINT
310   PRINTA0$(Q%)
320   PRINT
330   PRINT"Choose A,B,C or D .."
340   PRINT
350   PRINT"A) "+CHR$130+A1$(Q%)
360   PRINT"B) "+CHR$131+A2$(Q%)
370   PRINT"C) "+CHR$134+A3$(Q%)
380   PRINT"D) "+CHR$133+A4$(Q%)
390   PRINT
400   CE%(X%)=Q%
410   INPUT "Enter Your choice: " C$
420   IF LEN(C$)>1 THEN VDU 7,11:GOTO410
430   C=ASC C$
440   IF C>68 OR C<65 SOUND1,-15,10,5:VDU11:GOTO410
450   IF C$=A5$(Q%) THEN PROCcorrect:NEXT ELSE PROCwrong:NEXT
460 CLS
470 VDU14
480 PRINT
490 PRINTCHR$133+"You got ";C%;" Correct and ";W%;" Wrong"
500 IF W%=0 THEN 630
510 PRINTCHR$130+"I SUGGEST YOU REVISE :-"
520 PRINTR$
530 VDU15
540 PRINT
550 PRINT" Would you like a copy on a printer Y/N"
560 a$=GET$
570 IF a$<>"Y" OR a$<>"y" THEN 630
580 VDU 2
590 PRINT "You got ";C%;" Correct and ";W%;" Wrong"
600 PRINT "I SUGGEST YOU REVISE :-"
610 PRINT R$
620 VDU3
630 PRINT
640 PRINT" Do you want another go Y/N"
650 a$=GET$:IF a$="Y" or a$="y" THEN RUN
660 END
670
680
690
700 DEF PROCtitle
710 PRINT
720 PRINT TAB(7)+CHR$141+CHR$157+CHR$129+"Biology Questions  "+CHR$156
730 PRINT TAB(7)+CHR$141+CHR$157+CHR$129+"Biology Questions  "+CHR$156
740 PRINT
750 PRINT CHR$131;"Program and data written by S C Pithers"
760 PRINT
850 PRINT
860 INPUT "How many question do you want 1 22:"DN
870 IF DN<1 OR DN>22 THEN VDU11:GOTO860
880 ENDPROC
890
900
910 DATA "Osmosis is the process by which living cells take in "
920 DATA "Salt solution","Water","Carbon dioxide","Oxygen"
930 DATA "B","Osmosis"
940
950 DATA "Saliva contains an enzyme which acts    upon
960 DATA "Fat","Starch","Protein","Bile"
970 DATA "B","Digestion and Enzymes"
980
990 DATA "A chemical compound present in the plasmawhich helps the blood to clot"
1000 DATA "Adrenalin","Fibrogen","Haemoglobin","Albumen
1010 DATA "B","Blood"
1020
1030 DATA "When one of the following diseases affects heavy smokers more fequently   than non-smokers"
1040 DATA "Influenza","Bronchitis","Malaria ,"Typhoid"
1050 DATA "B","Respiration"
1060
1520 DATA "Which of the following is not a form of Bacteria"
1580 DATA "Cocci","Bacilli","Alveolus","Vibrio"
1570 DATA "C","Bacteria & Viruses (Protzoa)"
1580
1070 DATA "When an adolescent is at rest, his normal breathing rate in breaths per    minute is about"
1080 DATA  4","16","48","64"
1090 DATA "C","Heart"
1100
1110 DATA "Coiled sweat glands are found in the skin of mammals. In which layer are theyembedded "
```

continued on page 38



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```
1120 DATA "Dermis","Muscular layer","dead horny layer",
"Epidermis"
1130 DATA "A","Skin (Sensitivity)"
1140
1150 DATA "A temporary increase in the pulse rate  may
be caused by"
1160 DATA "Amylase","Antigens","Amino-acids","Adrenalin"
1170 DATA "D","Hormones"
1180
1190 DATA "In man, the cavity of the middle ear is filled
with"
1200 DATA "lymph","water","air","tissue Fluid"
1210 DATA "C","Hearing (Sensitivity)"
1220
1230 DATA "Which one of the following pairs of
substances is supplied to the foetus viathe umbilical
cord?"
1240 DATA "carbon dioxide and haemoglibin","Oxygen and
glucose","carbon dioxide
and glucose","Oxygen and urea"
1250 DATA "B","Reproduction"
1260
1270 DATA "Which one of the following is the white
part of the eye?"
1280 DATA "Sclera","choroid","retina","fovea"
1290 DATA "A","Eye (Sensitivity)"
1300
1310 DATA "Which is the energy carring molecule here"
1320 DATA "ATP - Adenosine triphosphate","DNA -
Deoxyribonucleic Acid","RNA   Ribonucleic Acid","TSH
- Thyroid Stimulating hormone"
1330 DATA "A","Respiration"
1340
1350 DATA "Which is NOT a genetic base in a DNA
1360 DATA "Adenine","Guanine","Iodine","cytosine"
1370 DATA "C","Genetics"
1380
1390 DATA "Which of the following is a sugar"
1400 DATA "sodium","pentose","thymine","insulin"
1410 DATA "B","Nutrition"
1420
1430 DATA "Which of the following is part of a neurone?"
1440 DATA "Dendrite","Carpal","Centromere","spirical"
1450 DATA "A","Nerves and coordination"
1460
1470 DATA "Which of the following is contained in
the palisade layer?"
1480 DATA "Lymphnodes","Chloroplasts","Amoeba",
"Synovial Fluid"
1490 DATA "B","Plants and Photosynthesis"
1500
1510 DATA "Which of the following is not contained in
the protoplasm of a living cell"
1520 DATA "Cell membrane","Endoplasmic Reticulum R&B",
"Cell wall","Mitochondria"
1530 DATA "C","Cell Structure"
1540
1590 DATA "Which of the following is a Bone"
1600 DATA "Radicle","Hilum","Plumule","Clavicle"
1610 DATA "D","The Skeleton"
1620
1630 DATA "Which of the following is not part of
the reproduction organs of either sex"
1640 DATA "Cervix","Oviduct","Epidermis","Epididymis"
1650 DATA "C","Reproduction"
1660
1670 DATA "Which of the following is a part of an
insects compound eye."
1680 DATA "Rhabdom","Neoplasm","Proceedium","Sclerotels"
1690 DATA "A","Insects & Senses"
1700
1710 DATA "Which is not organic"
1720 DATA "Cell membrane","Vitamins","Minerals",
"Protoplasm"
1730 DATA "C","Nutrition"
1740
1750 DATA "Which of the following is a tissue"
1760 DATA "Muscle","GSH - gonad stimulating hormone",
"the stomach","the skeleton"
1770 DATA "A","Tissue"
1780
1790 DATA "Man is a mammal because"
1800 DATA "he moves in search of food","he is a
vertibate","he has hair","he is warm-blooded"
1810 DATA "C","Mammal   amphibians etc"
1820 DATA "Where does meiosis take place"
1830 DATA "In the mouth","In the gonads","in the spleen",
"In the epidermis"
1840 DATA "B","Genetics   Meiosis"
1850
1860 DEF PROCcorrect
1870 C%=C%+1
1880 PRINT
1890 PRINTCHR$141+CHR$157+CHR$129;"CORRECT  "+CHR$156
1900 PRINTCHR$141+CHR$157+CHR$129;"CORRECT  "+CHR$156
1910 SOUND1,-15,110,5
1920 D=INKEY 120
1930 ENDPROC
1940
1950
1960 DEF PROCwrong
1970 W%=W%+1
1980 PRINT
1990 PRINTCHR$141+CHR$157+CHR$129;"WRONG  "+CHR$156
2000 PRINTCHR$141+CHR$157+CHR$129;"WRONG  "+CHR$156
2010 PRINT
2020 PRINTCHR$141+CHR$157+CHR$130;"The answer is
";A5$(Q%);"  ";CHR$156
2030 PRINTCHR$141+CHR$157+CHR$130;"The answer is
";A5$(Q%);"  ";CHR$156
2040 SOUND1,-15,10,5
2050 D=INKEY 170
2060 R$=R$+CHR$134+A6$(Q%)+CHR$13+CHR$10
2070 ENDPROC
```


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# Looking for a line

*Get searching with this new instring function for any Spectrum by* **Roy Whittle**

This is a machine code program which provides an *Instring* function for the Sinclair Spectrum.

When searching data stored in strings, I find the most useful function in both BBC Basic and QL SuperBasic is the *Instring* function, a function sadly lacking on the Spectrum. The *Instring* function searches for the occurrence of a short string in that of a longer string of text or numbers, etc.

This short machine code routine will provide this function for the Spectrum. The code is relocatable and can be loaded anywhere in memory. This means that it can be used on both 16K and 48K Spectrums.

The function is added by using the Spectrums ability for the user to define his own functions using *Def Fn* but instead of writing a basic function, a machine code routine is called. In this way parameters can be passed to the machine code without having to poke them into special memory locations.

The parameters can be passed in this way because when a user defined function is called, any variables the function uses are pointed to by the system variable *Defadd* (Chapter 25 in the Spectrum manual). By looking at this area of memory the parameters passed to the function can be found.

In this example the *Instring* function can be added as follows:—

*10 Def Fn i (a$, b$)= Usr 60000*

When the function is called by a line such as— *30 Print Fn i ("ab", "cab")* the work space is set up in the following way

From this information about the string to be searched (b$), the string to search for (a$), can easily be found.

Program 1

```
Machine code loader
10 CLEAR 29999
20 LET mc=30000:LET p=0
30 FOR x=mc TO mc+91
40 READ a:POKE x,a
50 LET p=p+a
60 NEXT x
70 IF p<>10092 THEN GOTO 100
80 SAVE "instr"CODE mc,92
90 PRINT "OK": STOP
```

```
100 PRINT 'Checksum Error'
200 DATA 221,229,221,42,11,92,221,94
6,221,86,7,123,178,40,70,221,110,15,
221,107,16,167,237,82,56,59,68,77,197
,221,94,4,221,86,5,221,110,13,221,102
,14,229,213,197,221,78,6,221,70,7,26,
190,32,19,35,19,11,120,177,32,245,193
,209,225,225,237,66,68,77,221,225,3,
201,193,209,225,120,177,40,4,11,35,24
,213,193,221,225,1,0,0,201
```

Program 2

Test Instring Function

```
 10 CLEAR 59999
 20 LET mc=60000
 30 LOAD 'instr"CODE mc
 40 DEF FN i(a$,b$)=USR mc
 50 PRINT FN i('ok',' t is ok")
 60 LET a$='it is ok'
 70 LET b$='ok'
 80 PRINT FN i('ok',a$)
 90 PRINT FN i( ok',a$(7 TO 1)
100 PRINT FN  (b$,a$)
110 PRINT FN i(' ,a$)
120 PRINT FN  (a$,b$)
```

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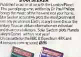
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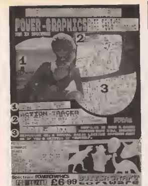
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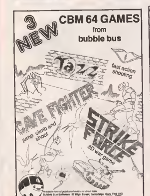
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# A new image

*Two new graphics commands for the CPC 464*
*by* ***Brian Cadge***

The graphics potential of the CPC464 is very promising, as can be seen from some of the first software to become available. However, in Basic the user is restricted to using user designed characters. The disadvantages of these are their size and the fact that only two colours can be present in each cell. To get more colours we have to individually plot the points using *Plot* and *Draw*. This is clearly too slow for fast action games.

Fortunately, it is quite simple to extend the Locomotive Basic (or any other language for that matter), using Resident System Extensions (RSX's). The program presented here gives you two new graphics commands. Firstly, here is an explanation of how to use the new commands from Basic.

All RSX commands start with the | character (obtained using *shift* and @ together), and these commands are called *Define* and *Place*. Their syntax is:
|DEFINE, image, width, height
|PLACE, image, xpos, ypos

Notice that a comma appears straight after the command name and before the first parameter. This is essential, as is the | character: if either is missed out then you'll get a syntax error.

The first parameter in both commands is *image* which is a number referring to the particular image you wish to address. The first *image* is numbered 0, the next 1 and so on. The more *images* you want the more memory you must reserve. As set up by the Basic loader you get space for two images, numbered 0 and 1. For every extra *image* you must lower *Himem* by 256 bytes.

*Width* is the width of the image in screen bytes (not in characters or pixels), there are always 80 column bytes on the screen, and so in *Mode 2* one character is one byte wide, in *Mode 1* a character is two bytes wide, and in *Mode 0* it is four bytes wide. *Height* is the height of the image in characters. The maximum size of an image is 7 × 4. This command assumes that the image to be stored is located in the top left of the screen. Therefore, you set up your character using *Plot* etc, and then use |*define* to get it off the screen. So in mode 1, to copy the equivalent of one character cell you would use |DEFINE, 0, 2, 1.

continued next week

**Basic listing**

```
5 'BASIC LOADER PROGRAM
10 MEMORY 42000
20 FOR I=42700 TO 42955
30 READ A$:V=VAL("&"+A$):C0=CS+V:POKE I,V
40 NEXT I
50 IF CS<>32566 THEN ?"DATA ERROR - CHECK LISTING!":STOP
60 CALL 42700
70 DATA 01,D6,A6,21,D2,A7,CD,D1,BC,C9,DE,A6,C3,E0,A6,C3,22,A7,44,45,46,49,4E
80 DATA C5,50,4C,41,43,C5,00,00,DD,46,04,04,FE,03,20,2E,21,C0,A7,CD,53,A7,DD
90 DATA 7E,02,07,28,22,E6,07,12,32,D0,A7,DD,7E,00 3D,E6,03,3C,32,D1,A7,10,12
100 DATA 3E,55,10,12,21,00,00,CD,1A,BC,22,CE,A7,CD,72,A7,C9,DD,46,04,04,FE,03
110 DATA 20 F7,21,C0,A7,CD,53,A7,1A,32,D0,A7,10,1A,32,D1,A7,10,1A,FE,55,20,E2
120 DATA DD,7E,02,3D,67,DD,7E,00,3D,6F,CD,1A,BC,22,CE,A7,CD,A3,A7,C9,25,10,FD
130 DATA 54,5D,01,F0,00,37,ED,42,22,CC,A7,C9,C5,E5,06,00,7E,12,7C,C6,00,67,13
140 DATA 10,F7,E1,C1,C9,ED,50,CC,A7,2A,CE,A7,ED,40,D1,A7,41,C5,E5,ED,40,D0,A7
150 DATA 41,CD,62,A7,23,10,FA,E1,CD,C4,A7,C1,10,EC,C9,C5,E5,06,08,1A,77,7C,C6
160 DATA 00,67,13,10,F7,E1,C1,C9,ED,50,CC,A7,2A,CE,A7,ED,40,D1,A7,41,C5,E5,ED
170 DATA 40,D0,A7,41,CD,93,A7,23,10,FA,E1,CD,C4,A7,C1,10,EC,C9,06,00,CD,26,BC
100 DATA 10,F0,C9
```

**Assembler listing**

```
                      10 ;
                      20 ; CPC464 Graphics extension
                      30 ;
A6CC                  40         ORG  42700
A6CC                  50         ENT  $
A7C0                  60 STACK   EQU  $+255
A6CC  01D6A6          70         LD   BC,DESPAT
A6CF  21D2A7          00         LD   HL,OSBUF
A6D2  CDD10C          90         CALL #0CD1
A6D5  C9             100         RET
A6D6  DEA6           110 DESPAT  DEFW COMMAN
A6D8  C3E0A6         120         JP   DEFINE
A6D0  C322A7         130         JP   PLACE
A6DE  44454649       140 COMMAN  DEFM "DEFIN"
A6E3  C5             150         DEF0 "E"+120
A6E4  504C4143       160         DEFM "PLAC"
A6E0  C5             170         DEF0 "E"+128
A6E9  0000           100         DEF0 0,0
```

Continued on page 46

```
                  190
                  200
A6E8  DD4604      210 DEFINE LD   B,(IX+4)
A6EE  04          220        INC  B
A6EF  FE03        230        CP   3
A6F1  202E        240        JR   N2,EXIT
A6F3  21C0A7      250        LD   NL,STACK
A6F6  CD53A7      260        CALL GETADR
A6F9  DD7E02      270        LD   A,(IX+2)
A6FC  B7          280        OR   A
A6FD  2822        290        JR   2,EXIT
A6FF  E6D7        300        AND  7
A701  12          310        LD   (DE),A
A702  32D0A7      320        LD   (HORL),A
A705  DD7E00      330        LD   A,(IX+0)
A708  3D          340        DEC  A
A709  E603        350        AND  3
A70B  3C          360        INC  A
A70C  32D1A7      370        LD   (VERL),A
A70F  1B          380        DEC  DE
A710  12          390        LD   (DE),A
A711  3E55        400        LD   A,85
A713  1B          410        DEC  DE
A714  12          420        LD   (DE),A
A715  210000      430        LD   NL,0
A718  CD1A0C      440        CALL #0C1A
```



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Alright, let's all gather round the computer for a good old sing-song

You'll find the new Commodore 64 Music Maker strikes exactly the right note, whether you're an accomplished musician or whether you are an out-and-out beginner

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# Open Forum

**We are always actively seeking programs for publication — either for Open Forum, the machine pages or Star Game. When sending in a program for consideration, a clear program listing should be sent, together with, wherever possible, a saved copy on cassette. Documentation — usually not more than 1000 words — should start with a general description of the program, what it does, and then some detail of how the program itself is constructed. We pay very competitive rates, according to the length and nature of the program and the quality of the accompanying documentation.**

## Hex Converter

### on Amstrad

This program is a standard Decimal to Hex Converter, which is itself a convertion from a Vic 20 program ... confusing, isn't it? Nevertheless, it should be of interest to us Amstrad CPC464 users.

```
1 REM Converted from VIC20 program
2 REM previously published in PCW
3 REM Convertion by R J Hosford 1/8/84
4 REM ********************************
5 MODE 1
6 s$ = "                    "
7 CLS
8 FOR i=7 TO 19
9 LOCATE 10,3 INPUT "decimal number",a$  v=VAL(a$)
10 LOCATE 10,3 PRINT s$
11 IF v <0 OR v>65535 THEN 9
12 h=INT(v/256) l=v-256*h
13 PRINT  PRINT"        DEC  HI  LO  HEX"
14 LOCATE 6,i PRINT RIGHT$ ("    "+STR$(v),5)+"  ",
15 PRINT RIGHT$("   "+STR$(h) 3)SPC(2)RIGHT$("   "+STR$(l),3),
16 z=h GOSUB 26  h$=c$
17 z=l  GOSUB 26  l$=c$
18 PRINT SPC(3)" "+h$+l$
19 NEXT i
20 PRINT d$ PRINT"continue ? y\n"
21 LOCATE 10,22 INPUT a$  IF a$ =" " THEN 21
22 IF a$="y" THEN 7
23 IF a$ <>"n" THEN 21
24 END
25 REM
26 x=INT(z/16) y=z-16*x
27 IF x < 10 THEN x$ = RIGHT$ (STR$(x),1)  GOTO 30
28 ON x-9 GOSUB 35 36,37,38,39 40
29 x$=t$
30 IF y < 10 THEN y$ = RIGHT$ (STR$(y),1)  GOTO 33
31 ON y-9 GOSUB 35,36,37,38,39,40
32 y$=t$
33 c$=x$+y$  RETURN
34 REM
35 t$="A"  RETURN
36 t$="B"  RETURN
37 t$="C"  RETURN
38 t$="D"  RETURN
39 t$="E"  RETURN
40 t$="F"  RETURN
```

**Hex Converter**
*by R Hosford*

# Arcade Avenue

## On the Amstrad

I was very pleased to receive the first couple of letters to the column from Amstrad owners. The first is from James Marshall of unknown abode who has written about the game *Roland on the Ropes* adapted from the Spectrum Quicksilva release *Fred*. "For those who are disenchanted with the game due to the enormous amount of inhabitants dwelling in the tombs, can I say don't give up. On getting out of the fourth level, and every screen from then on, you are given the opportunity to select the number of ghosts, mummies and skeletons, etc that appear which is much better than leaving it to the computer. Also the speed of the game greatly increases and the mazes become more complex. In fact I would say that the game really begins after level 4. I have managed to complete 37 levels and my score' has completely turned the clock. PS Beep up the great work — this mag really interacts with the readers."

Richard Couchman of St. Ives writes about Amsoft's *Harrier Attack*. "I was at first very disappointed as the graphics were the same as the Spectrum version and still flickery. The sound was better but didn't use the machine's facilities to the full. But after a few games I made it back to the ship and found that it actually allows you to take off again."

Thanks to both of you for your comments and I look forward to hearing more about this machine. So much Amstrad software is a conversion of Spectrum games, presumably because the authors are most familiar with Z80 code, but keep an eye out for Anirog's games as they seem to be one of the very few companies converting Commodore games to the machine even though the 464 has similar facilities.

I was also very pleased to hear from N J MacArthur of the Isle of Tiree in Scotland who writes about *Chuckie Egg*. "I would highly recommend this to any Dragon owner — it is very enjoyable even though it does not get faster after level 26 making it lose a bit of its competitive edge. Having read of a score of over one million in a recent *PCW*, I set out to beat this and after 7½ hours of continuous play I had to give up with a record score of 4 081,790 on level 208 with over 50 lives left." Well how do you beat that? I think it proves the quality of the game — many games I see can't retain my interest for even seven minutes.

Two people have written in response to B P Jay's score on *Full Throttle*. Mark Gill of Leeds has completed 7 circuits on 4 lap races and Silverstone, Italy and Yugoslavia in 3 laps. His tip is to accelerate all the time and skid off the track to pass other bikes. Stuart Young has finished all 10 circuits on 2 laps by the 17th August after having the game for only 11 days. "The way to succeed is to stay at the edge of the track and the outside of bends to avoid crashes." This arcade wizard has also scored 64,250 on *Pole Position* and 10030 on *Stop the Express* which beats the 6400 scored by Colin Johnson of Bishop Auckland in County Durham. Colin has, however, achieved the huge score of 258800 and 95% on *Sabre Wulf* even though he had only found 3 pieces of the Amulet!

**Tony Kendle**

The Arcade Corner is a new section for anyone who enjoys playing arcade games. If you have any comments, from playing tips on difficult games or programs you'd particularly like to praise (or blame!) then write to: Tony Kendle, Arcade Avenue, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.

# Open Forum

## Memory Scan

### on Commodore 64

This program will display any portion of memory as 40 column CBM Ascii, displaying all unprintable codes as ".".

Simply enter the start and end address of the memory to be examined. (To scan from the beginning of memory hit return instead of entering an address. To scan to the end of memory hit return instead of the end address.)

The scan may be paused by holding the *Space* bar or slowed down by using the *Ctrl* key. To abort scan use the *Run/Stop* key.

If you stop the program using the *Run/Stop* key you may find the approximate address of the last line displayed by typing *"goto 200"* followed by *Return.*

```
10 PRINT CHR$(147)
20 FOR L=49152 TO 45210: READ A: T=T+A: POKEL,A: NEXT
30 IF T<>8111 THEN PRINT"DATA ERROR": STOP
40 INPUT"ENTER START ADDRESS";A
50 INPUT"ENTER END ADDRESS";E
60 X=INT(A/256): Y=A-(X*256)
70 POKE 49137,X: POKE 49152,Y: POKE 45210,INT(E/256)
80 SYS 49152
90 :
100 DATA 160,000,132,251,169,000,133,252
110 DATA 177,251,201,032,144,020,201,127
120 DATA 144,004,201,160,144,020,032,210
130 DATA 255,160,197,224,000,240,250,032
140 DATA 225,255,240,028,200,240,011,076
150 DATA 008,192,169,046,032,210,255,076
160 DATA 025,192,165,252,024,105,001,133
170 DATA 252,201,255,240,002,076,039,192
180 DATA 96
190 :
200 PRINT PEEK(252)*256+PEEK(251)

C000 A0 00      LDY #$00
C002 84 FB      STY $FB
C004 A9 00      LDA #$00
C006 85 FC      STA $FC
C008 B1 FB      LDA ($FB),Y
C00A C9 20      CMP #$20
C00C 90 14      BCC $C022
C00E C9 7F      CMP #$7F
C010 90 04      BCC $C016
C012 C9 A0      CMP #$A0
C014 90 14      BCC $C02A
C016 20 D2 FF   JSR $FFD2
C019 A6 C5      LDX $C5
C01B E0 3C      CPX #$3C
C01D F0 FA      BEQ $C019
C01F 20 E1 FF   JSR $FFE1
C022 F0 1C      BEQ $C040
C024 C8         INY
C025 F0 0B      BEQ $C032
C027 4C 08 C0   JMP $C008
C02A A9 2E      LDA #$2E
C02C 20 D2 FF   JSR $FFD2
C02F 4C 19 C0   JMP $C019
C032 A5 FC      LDA $FC
C034 18         CLC
C035 69 01      ADC #$01
C037 85 FC      STA $FC
C039 C9 00      CMP #$00
C03B F0 03      BEQ $C040
C03D 4C 27 C0   JMP $C027
C040 60         RTS
```

**Memory Scan**
*by I Bennett*

# The Music Box

## Digital sample

News from Autographics, makers of the Microsound add-on keyboard for the Commodore 64. The eagle-eyed among you may have noticed the company advertising a new version of their keyboard. As I write, this is not yet available. However, if the new keyboard is everything it promises to be then you would be wise to get in the queue.

The original Microsound received very good reviews when it first came out. Now, Glyn Williams of Autographics tells me the music keyboard has been improved in appearance and performance and the hardware and software to add comprehensive digital sampling is having the finishing touches put to it.

Digital sampling is all the rage at the moment. In essence, the technique is a way round the problems of digitising the signals from an analogue musical instrument (as dealt with in an earlier column). Instead of having to convert a whole piece of music into digital form for storing and processing in your computer, a sampler takes a typical note (in fact, any sound at all can be used), converts it into digital form and then uses the data from this conversion to produce an entire range of notes from a musical keyboard.

Professional digital samplers have been widely used in the music business for two or three years now, the best-known device being the Fairlight CMI 'music computer'. But the Fairlight and similar devices retail for the price of a small house or flat.

The price of the new Microsound (£199 for the keyboard and software plus £299 for the digital sampler and software) make it potentially one of the most exciting computer music developments around. A complete package from scratch — including computer, disk drive, monitor and Microsound — would set you back about £1000.

Glyn Williams tells me that, along with standard sampling features the new Microsound will feature MIDI, modulation of sampled sounds using the 64's SID chip and a split keyboard enabling you to play two different instrumental sounds at once. Impressive.

At present, everyone is fushing to buy the DS:3 sampler from Greengate, a company formed by the experimental band Mainframe and some computer wise friends. The DS:3 is designed for an Apple IIe (or equivalent) system and costs £450 plus VAT, including hardware, software and a small music keyboard (but without the Apple gear). A complete system sells for £1400.

I must say that if the Microsound turns out to be half as good as the DS:3, Autographics will be on to a winner. To hear what digital sound sampling can do — with no outside assistance — look out for Mainframe's 12-inch record, *Into Trouble with the Noise of Art* (on the YYY label). You can write to Greengate at 24 Missenden Drive, Hemel Hempstead, Herts HP3 8QR (tel. 0442 3496) and to Autographics at PO Box 14, Petersfield, Hants GU32 1HS (tel. 073087 403).

**Gary Herman**

The Music Box is a new weekly column with news, reviews and readers comments on all aspects of micros and music.

Any readers with experience of computer aided making or companies with new product news are invited to write to drop a line explaining what they're doing to Gary Herman, The Music Box, 12-13 Little Newport Street, London WC2R 3LD.


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# Open Forum

## Base Attack

### on Vic20

This is a fun Space Wars program written for the unexpanded Vic 20 called *Base Attack*. Can you thwart the Invasion of the Groggs?

**Program Notes**

| | |
|---|---|
| 6-10 | Prints instructions and sets up screen. |
| 36-47 | Data for characters |
| 126-170 | Clears the screen and gives positions for you and the Groggs |
| 196-240 | Puts you, your base, your boundaries and the Groggs onto the screen. |
| 250-8005 | Main Routine which allows you to move left, right and fire. It also allows the Groggs to move randomly. The score routine is also contained here. |
| 9000-10116 | Sounds an explosion and informs you that you have been invaded. |
| 18000-18030 | Try again routine |

```
0 OPEN4,4 CMD4
1 LIST
5 POKE36879.104
6 GOTO43999
7 POKE36878,15
10 POKE36869,255
36 FORS=7168TO7168+79 READF POKES,F NEXT
37 DATA0,0,0,0,0,0,0,0
38 DATA24,153,165,102,36,102,126,153
39 DATA66,0,66,0,66,0,66,0
40 DATA255,153,153,255,255,153.153,255
41 DATA24.36 90,255,126,66,36,195
42 DATA36,90,165,102.36,0,20.129
43 DATA60,66,153,129,126,36 66.153
44 DATA129 195,165,153,153.165 195,153
45 DATA24,153,255,24,60,66,66,129
46 DATA60.66,90,219,219.90,66,60
47 DATA252,126.120,252,6.6,6.254
126 B=8174
```

# Microradio

**GW6JJN**

## Signalled

Once more PNP Communications of 62 Lawes Avenue, Newhaven, East Sussex, BN9 9SB deserve a mention. For all those Amstrad Owners out there who write into the magazine asking where the software is, ask no more PNP is into programming the Amstrad for the radio enthusiast Their first program for this machine is a Morse Tutor Five modes of operation are possible Firstly a structured tutor in itself, letters that need to be practiced can be specified. It has a library of words that can be randomly selected and text to be translated into morse can be entered from the keyboard. In addition, a data cassette can be prepared under program control to feed in when required.

Over two hundred words are available from the program's library which have been specially chosen to cover the widest possible range of letter groups Further words or text can be loaded from a previously prepared data cassette which is useful in setting up a dummy run of the morse test itself. A separate program is supplied to help set up the data cassette.

The speed range is from 4 to 24 words per minute which is more than adequate for the amateur. Figures are included in a separate section of the tutor although they can be mixed with letters if required. Morse Tutor for the Amstrad CPC464 costs £6 90 and is available direct from PNP

Almost in the same breath, PNP announced a new, multi-standard RTTY/Morse code Terminal Unit It is what they call a matched filter type unit and it is for receive only Aimed primarily at the serious short-wave listener, the unit is suitable for interfacing a communications receiver to any home micro The matched filter/rectifier/integrator design makes it eminently suitable for demodulating Morse Code.

The unit consists of two active filter chains. One is fixed at 1275Hz for SPACE and the other is electronically switched to either 1445Hz for 170Hz shift or 1700Hz for 425Hz shift or 2125Hz for 850Hz shift MARK signals. It is this channel used for Morse decoding There is also an ALC system to cater for a wide range of input signals and to compensate for fading, etc. in addition, a bar-graph type tuning indicator is provided to enable the accurate tuning of RTTY

This terminal unit is also suitable for signals in excess of 200 baud and for the reception of AMTOR. All connections are by neat plugs and sockets and is supplied as a built and aligned unit complete with mains transformer At the moment, only a built unit can be supplied but PNP say that a kit will be available shortly The PNP multi standard terminal unit costs £32.50 plus VAT and more details can be had by calling PNP on 0273 514465

News just in for Spectrum owners is that there is now a program for the 48K Spectrum that will transmit and receive RTTY actually without any interface at all. Just load the program and go. All input and output is via the *Ear* and *Mic* sockets I hope to review this new program very soon in Microradio, but until then contact G1FTU on 0246 810652 for more details

**Ray Berry**

This series of articles is designed for radio and microcomputer enthusiasts alike. If you have any queries that you want answered, hints and tips to share or topics that you would like to see covered, write to *Ray Berry, Microradio, Popular Computing Weekly*, 12-13 Little Newport Street, London WC2H 3LD

```
128 FORE=7680TO8185 POKEE,0 NEXTE
130 A(1)=7746
140 A(2)=7812
150 A(3)=7879
160 A(4)=7944
170 A(5)=8010
190 POKE8185,3 POKE8164,3 POKE8141,9
190 POKEB,1
200 POKEA(1),4
210 POKEA(2),5
220 POKEA(3),6
230 POKEA(4),7
240 POKEA(5),8
250 X=INT(RND(1)*5)+1
260 IFX=1THEN1000
270 IFX=2THEN2000
280 IFX=3THEN3000
290 IFX=4THEN4000
300 IFX=5THEN5000
350 GETA$
360 IFA$="*"THENGOTO6000
370 IFA$="#"THENGOTO7000
380 IFA$=CHR$(32)THENPOKE36876,200
    FORT=1TO60 NEXTT POKE36876,0 GOTO8000
```

# Book Ends

**Book** *Giant Book of Spectrum Arcade Games* **Price** £3.95 **Micro** Spectrum 48K **Supplier** Fontana Paperbacks 8 Grafton Street London W1X 3LA

Is there really a sub-cult of Spectrum owners who prefer to spend longer typing in a game than they will playing it? Publishers seem to think so because they continue to churn out volumes of listings many of which are presumably destined for Father Christmas's sack

Most of these books cause feelings of déja-vu for the reviewer, but at least this one contains a few new ideas and avoids the almost inevitable adventure by concentrating on arcade games

The inclusion of a few machine code routines give the games an edge on purely Basic versions, and notes to aid modification are also useful, but I still fail to see the attraction of such books At least this one is cheap

John Minson

**Book** *Exploring Artificial Intelligence On Your Microcomputer* **Price** £4.95 **Supplier** Interface Publications 9-11 Kensington High Street, London W8 5NP

Will a computer one day write as many books as Tim Hartnell? This practical introduction to the much-discussed topic of A.I. is one of his better offerings

Four main areas are examined, simulating thought, games playing, language recognition and expert systems Each section contains several listings, the development and workings of which are explained. There is also some historical context, expanded by a useful bibliography.

The lack of an index is unfortunate, and I don't like the type setting but the inclusion of an appendix on structured programming is welcome

While it is not perfect, this book provides a useful introduction to A.I for owners of machines with MSX or Microsoft compatible Basics; Sinclair owners will have to do some conversion work first, though.

John Minson

**Book** *Business Programming On Your Commodore 64* **Price** £7.95 **Micro** Commodore 64 **Supplier** Phoenix Publishing Associates Ltd., 14 Vernon Road, Bushey Herts WD2 2JL

A collection of listings with a difference, aimed not at the arcade kid but the micro-shy sales or marketing manager

The book does not aim to teach Basic in its 150 pages, but it does explain the role of computers in an area of business where they are often neglected.

It introduces some concepts of the language, and presents various data handling programs with lengthy comments on their construction, logic and use

It is not an 'idiot's guide' but is user-friendly and, providing enough time is devoted to understanding the examples, it should prove useful. I suspect that its philosophy of 'write your own' is a trifle optimistic, but it could help businessmen understand and evaluate bought-in software more fully

John Minson

```
400 GOTO250
1000 Y=INT(RND(1)*30)+1
1005 IFA(1)=7500THEN350
1010 A(1)=A(1)+Y
1020 POKEA(1),4 POKEA(1)-Y,0
1030 IFA(1)=>8141THEN9500
1040 GOTO350
2000 Y=INT(RND(1)*25)+1
2005 IFA(2)=7500THEN350
2010 A(2)=A(2)+Y
2020 POKEA(2),5 POKEA(2)-Y,0
2030 IFA(2)=>8141THEN9500
2040 GOTO350
3000 Y=INT(RND(1)*15)+1
3005 IFA(3)=7500THEN350
3010 A(3)=A(3)+Y
3020 POKEA(3),6 POKEA(3)-Y,0
3030 IFA(3)=>8141THEN9500
3040 GOTO350
4000 Y=INT(RND(1)*10)+1
4005 IFA(4)=7500TNEN350
4010 A(4)=A(4)+Y
4020 FOKEA(4),7 POKEA(4)-Y,0
4030 IFA(4)=>8141THEN9500
4040 GOTO350
5000 Y=INT(RND(1)*5)+1
5005 IFA(5)=7500THEN350
5010 A(5)=A(5)+Y
5020 POKEA(5),8 POKEA(5)-Y,0
```

**Base Attack**
*by Steve Carr*

# Baud Walk

## Data path

Britain's publishing companies are starting to get serious about database publishing — and that's got to be good news. The *Economist*, Pergamon *The Guardian* all now have an involvement with electronic publishing.

Next year I predict at least two major developments from computer magazine publishing houses giving a wider choice of services for baud walkers. Database Publishing, which publishes *Micro User* for BBC owners plans a magazine all about networking

News International has already announced its TTNS (The Times Network for Schools) schools' network based on the public eletronic mail and noticeboard service Telecom Gold and PSS.

Schools joining TTNS will be supplied with a starter pack — suitable for the BBC and Research Machines micros — consisting of a multiple baud-rate (1200/1200 half-duplex, 1200/75, 300/300, 1200/1200 pseudo-full duplex) auto-dial auto-answer modem, and the necessary software to access the network. Also supplied is a tutor program and operation manual. The whole lot knocks out at a basic price of £152, though it is only available for schools

With so many of the main publishing companies beginning to take such an active interest in electronic publishing, the UK Publishers' Association recently met to coordinate how best to make the information we get in print available on databases at a price people can afford.

One of their battle grounds will be with the Government, and presumably BT, in presenting the pulishers case to get the cost of data calls (as opposed to telephone calls) down

Data paths can easily be monitored at exchanges and with BT experimenting with itemised billing, cheap data call tariffs cannot be ruled out simply because of administration problems and the like

The cost of modems has now come down to a sensible level, development in printing technologies are well advanced — and a cheap data rate would make good sense After all, Prestel was invented to try and get people using the telephone more at off peak times.

**Robin Wilkinson**

**Baud Walk** is a new weekly column with news on networking, databases, reviews of modems and software and points of contact for information.

Any readers with experience of networking are asked to send their experiences or news of services to Robin Wilkinson, Baud Walk *Popular Computing Weekly* 12 13 Little Newport Street, London WC2R 3LD

He can also be contacted on Prestel mailbox 013093737

# Choosing the right computer is a good start — but can you find the right software?




At SUPERSOFT we're very conscious of the fact that people who spend several hundred pounds on computer equipment are looking to do rather more than play Space Invaders.

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Of course, we do also publish games programs, and with classics like **STIX, QUINX** and **KAMI-KAZE** in our range we are one of the market leaders. But we most enjoy coming up with the sort of programs that are going to be in use for months and years, not hours and days – the sort of programs that make you glad that you bought a computer – and glad that you bought SUPERSOFT!

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# Tony Bridge's Adventure Corner



## On a budget

About the only place that Dragons pose serious threat nowadays is in adventures! It's a pity that after a slow start software for the Welsh computer was just beginning to get into its stride when the company collapsed. For us adventurers, there wasn't much to rave about — apart from pretty dire offerings from houses like Virgin Games, there was only *Pettigrew's Diary* from Shards Software, (recently translated to the Spectrum), the *Ring* epics, Wintersoft's not Wagner's and the *Dan Diamond* Trilogy from Salamander. I noticed a letter in another magazine (which shall remain nameless) from Neil Scrungeour, who has written to The Corner on occasion. He has started a national Dragon group with Paul Grade. Neil is running the Adventure section — best of luck with it Neil. Write to Paul Grade at 6 Navarino Road, Worthing, Sussex, including a SAE.

The subject of budget games continues to vex computer users. Are they the ultimate deterrent against piracy or merely dumping grounds for dud products by less than scrupulous software houses? The first assumption is I believe, naive even if games are awful and are for sold 20p there will still be more copies pirated than sold — after all, they will probably only be played once or twice before being consigned to a deep dark drawer. Good games, on the other hand, are eminently collectable, and, particularly if the package includes more than just the usual bare cassette with a bit of lame fantasy scenario, the game will be bought in its thousands. Put yourself in the place of a 12-year-old with just a few pounds in his pocket — he can only afford one or two games at a time, and he will spend it on the ones which play well and look good and professional.

Unfortunately, some software houses feel that budget games equal inferior games, but not all. Mastertronic, in particular, are well known for their cheap packages but if the games I've seen from them are an indication of the whole range then the quality is the equal of higher-priced products.

Now, several adventures join the ranks of Mastertronic software, with their new series Master Adventurer. *Volcanic Dungeon* and *Black Crystal* will be well-known already, from the Carnell Software days. *Black Crystal* remains as it was, but at an incredible price of £2.99 for the six part 160K adventure which comes on two cassettes complete with booklet containing the first part of the "Third Continent" story. This story is continued in *Volcanic Dungeon* also at £2.99 and which is basically the same program (one of my all time favourites), with added graphics.

A new program again at £2.99, is *Se-Kah of Assiah*, by Clive Wilson and Les Hogarth. This is a two-part, 96K, graphic adventure for the Spectrum and Commodore 64, and has kept me diverted for several days now. Starting in a village hard by a forbidding castle, the adventurer's task is to enter the Castle, search for (hence he is a Se-Kah groan!) and recover the Three Great Artefacts of the Wise Ones (nothing is plain ordinary in Mastertronic's world), then escape and deposit them in final resting places. You'll find 170 locations, all depicted in nicely-drawn if blocky graphics — text input and program response is reasonably fast, and full sentence analysis is featured. One day, I'll discuss full sentence analysis in greater depth, but in passing, let me say that I often wonder just how useful this can be. I find the more prosaic two-word commands will cover most situations.

There are a couple of weird things going on with the text handler in Se Kah. Type in 'WEST', for example, and the answer is 'That will get you nowhere', or 'West what?' — try 'W' and the desired effect is achieved.

However, *Se-Kah* is outstanding value — it was originally intended to be marketed at £7.99 and it shows, with good graphics and generally good presentation. I can't think of any reason against rushing out to part with £2.99 in exchange for this great newcomer — if you do, take my advice, and search around the village at the very start.

A couple of weeks ago, I was talking about a program sent to me by Keith Wadhams. This was a Quill'd adventure for the Commodore, and Balsak the Bulbous aka The Great Wizard, aka Ken Matthews looked at it for me and was impressed. He mentioned it to a well respected software house and now it seems that Keith's program will be released very soon.

Another Quill'd adventure comes from Compass Software. It is the first in a series, and is called *Project X. The Micro Man*. It concerns the exploits of a rather ham-fisted scientist who has managed to make himself smaller than an ant. Colour is used quite well, and each object has a little associated graphic. There are the obligatory grammar and spelling mistakes and I find it a little strange that The Quill is not mentioned in the program. Most of the puzzles are straightforward, but the scene-setting is atmospheric and the program is reasonable value at just £3.25 including p & p. Write to Compass at 63 Cosens Road, Norwich NR1 1JP.

Now, let The Grand Elf and I say a very big 'thank you' to the many greetings and good wishes we receive from fellow adventurers who just want to say "Keep up the good work — more space for The Elf.", it's nice to know that someone is on the other end of the Corner. We also get the occasional winge from you, though: "When are you going to review *Fred goes to the Launderette* it's FANTASTIC (and written by my brother)" or "When are you going give us some more tips instead of all these boring reviews?" Well, both points of view are valid, so here are a couple of hints!

In *Golden Baton*, which seems to be the most popular Channel 8 adventure at the moment (or, at least, the one which is foxing most people)

To get past the Crabs, say *Feed Slugs* (you did *Get* and salt them, didn't you?) — for some reason, crabs hate the sight of salted slugs.

And for those of you stuck in the railway carriage at the very beginning of another Channel 8 adventure *Ten Little Indians*, just *Wait*, *Wait* and then *Go East*. Then *Go Down*, where you will find something interesting.

This series of articles is designed for novice and experienced Adventurers alike. Each week Tony Bridge will be looking at different Adventures and advising you on some of the problems and pitfalls you can expect to encounter. So if you have an Adventure you want reviewed, or if you are stuck in an Adventure and cannot progress any further write to Tony Bridge, Adventure Corner, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.

### Adventure Helpline

Going bananas? If you are stuck in an Adventure with nowhere to turn do not despair — help is at hand.

Fill in the coupon, explaining your problem send it to us and a fellow adventurer may be able to help.

Remember — the system only works if those adventurers who have solved the puzzles get in touch. Every week is Save An Adventurer Today (SAAT) week!

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# Peek & Poke



## Reverse effect

*A Garside of Flixton, Manchester writes:*

**Q** In Vol 3 No 35 a reader asked you for a *Poke* to obtain a zero line number in a program. The *Poke* that you mentioned was I think a little complicated. *Poke 23756,0* sets the first line number to zero, and *Poke 23755,1* reverses this effect. I also have a very handy routine that makes the listing of a Spectrum Basic program very hard (if not impossible), if you make the first line of your program.

```
POKE PEEK 23635-256-PEEK
23636,255.
```

**Enter this as line 0. If you want to make doubly sure that your listings are safe, then type in the above line after having got into extended mode and typed *Caps Shift* and 7. I hope that this information is of help to your readers.**

**A** Not so much an answer, more a comment. The *Pokes* I gave in my reply work even if the Basic program is relocated in memory. Your method relies on the Basic program always starting in the same place (which of course it usually does).

## Abbreviated words

*Liz O'Brien of Madeley, Cheshire, writes:*

**Q** When typing a Rem statement, I have several times used the keyword abbreviations inside the Rem, and when the program has been listed the keywords have been completely different from the ones I typed in. Is this normal on a Commodore 64 or is my machine faulty? Should I abbreviate words inside a Rem?

**A** Interesting effect this ... reminds me of the story of the computer that learned to program itself. It would appear that you have stumbled across a minor hiccup in the CBM Basic interpreter, as the manual clearly states that any characters appearing in a Rem will be *Listed* exactly as they are entered. It would not be true to say that the effect you describe is likely to cause any problems with the programs you write, but for clarity's sake, I would use full words and not the abbreviations.

## Forth Rom for ZX81

*Peter Donnet of Cambridge, writes:*

**Q** I have heard that there is a Forth Rom for the ZX81, is this true and will it work with the 16K Rampack version?

**Also, does it have any printer commands? From where can I obtain a copy, or more details?**

**A** There is indeed a Forth Rom for the ZX81, produced by Skyware Software. It supports the 16K Ram version, and also the ZX printer. You can contact Skyware at 73 Curzon Road, Bournemouth BH1 4PW.

## Speeded-up Basic

*Sam Evans of Cardiff, writes:*

**Q** I have a Commodore 64 which I am extremely pleased with. However, there is one thing that I would like to know, is there any way of speeding up Basic programs. I know that machine code is a lot faster but I have enough trouble with Basic and I think that machine code might well be beyond my capabilities.

**A** There are a number of ways of speeding up Basic programs; the most common method is to use a Basic compiler. This effectively translates your Basic program into machine code for you, so you get the benefits of machine code program speed without the pain and anguish of actually writing it.

One other method, which achieves a much lower return, but is quite worth using, is to set the screen colour to be the same as the Border colour. This can be done by *Poke 53265,Peek (53265) AND 239*. Doing this results in about a five per cent increase in speed. To reset the screen to normal, use *Poke 53265,Peek (53265) OR 16*.

## Reading the keyboard

*F Bartolo of Swindon, writes:*

**Q** I have a number of questions concerning the Colour Genie, which I hope you can help me with. How do you disable Break? How can I turn off the keyboard? How can I read the keyboard, ie, detect what keys are being pressed?

**A** To disable Break you need to *Poke 16396 123*, to re-enable it you *Poke 16396,201*.

If you disable the keyboard your programs will in fact run somewhat faster; disable the keyboard by *Poke 16405,0*. To re-enable the keyboard *Poke 16405,1*.

As far as reading the keyboard is concerned, location 16420 holds the ASCII value of the last key pressed. So by Peeking this location you will be able to detect key depression. One last point is that the function keys have the ASCII value 92 96 unshifted, and 124-127 shifted.

## Atari information

*D Skinner of Lowestoft writes:*

**Q** In your magazine, which I buy every week, you seldom have any information regarding Atari computers. Why is this? Do you have some personal dislike for Atari?

**What about some hints and tips for this machine.**

**A** I've got nothing against Atari, I just don't get any letters from Atari owners (except this one). As to why I don't get letters from this group, I honestly do not know. Now for a bit of light relief ... all Atari owners reading this, try this routine, you should get an interesting effect on your colour screen.

```
10 POKE 1536,141 POKE 1537 198.
POKE 1538,2. POKE 2,0· POKE 3 6
POKE 9,2
```

Type the above in, and then press *Reset* ... pretty, eh?

## Similar statement

*H Caan of Ruislip, Middlesex, writes:*

**Q** I would like to know what the Vic 20 statement is that corresponds the Spectrum's *Print At* command.

**My friend has a Spectrum and he is always bragging about this feature which I don't have. I am sure that you must be able to do this on the Vic, but I don't know how.**

**A** Unfortunately, there is no equivalent of the *Print At* command on the Vic. You can, however, achieve the effect you want by writing a subroutine to carry out the printing for you.

*Print At*, as you probably know, displays at a specified line and column position on the screen. If we say that the cursor is to be moved to position X,Y on the screen before printing, then to simulate *Print "tethered goat" AT 4,4*, you could use the following:

```
40 X = 4. Y = 4 GOSUB 2000·
PRINT "tethered goat"
2000 POKE 781,X. POKE 782,Y
2010 POKE 783,PEEK (783) AND
254
2020 SYS 65520· RETURN
```

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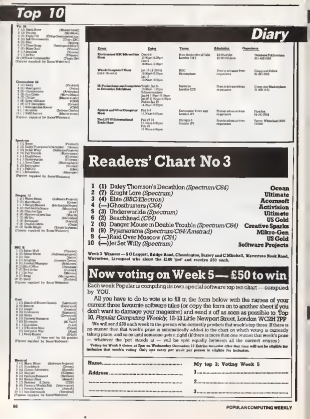
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7 (5) Bird Strike (Firebird)
8 ( ) Jet Pac (Ultimate)
9 (7) Swag (Micropower)
10 (9) Duck (Firebird)
(Figures supplied by Boots/Websters)

**Atari**
1 (1) Attack of Mutant Camels (Llamasoft)
2 (5) Encounter (Centresoft)
3 (7) Leggit (Imagine)
4 (6) Gridrunner (Llamasoft)
5 (4) Slinky (Centresoft)
6 (2) Caverns of Mars (Atari)
7 (0) Electrician (Hi-Tech)
8 ( ) [illegible] (L & S)
9 ( ) O'Reilley's Mine (CSoft)
(5) Computer War (Atari)
( ) [illegible] (D'Soft)
(2 items tied for 9th position)
(Figures supplied by Boots/Websters)

**Electron**
1 (1) Manic Miner (Software Projects)
2 (2) Hunchback (Ocean)
3 (4) Classic Adventure (Acornsoft)
4 (3) Blagger (Alligata)
5 (3) Fantasia Diamond (Hewson)
6 (6) Sphinx Adventure (Acornsoft)
7 (7) Snooker S. Davis (CDS)
8 (8) Forest at Worlds End (Interceptor)
9 (–) [illegible] Attack (Acornsoft)
10 (–) Star Commando (Terminal)
(Figures supplied by Boots/Websters)

# Diary

| Event | Dates | Venue | Admission | Organisers |
|---|---|---|---|---|
| Electron and BBC Micro User Show | Dec 6-8 10.00am-6.00pm Dec 9 10.00am-4.00pm | New Horticultural Halls London SW1 | £3.00 adults £2.00 children | Database Publications 061-456 8383 |
| Which Computer? Show (over 18s only) | Jan 15-17 (1985) 10.00am-6.00pm Jan 18 10.00am-4.00pm | NEC Birmingham | Free in advance from organisers | Clapp and Pollak 01-891 2001 |
| Hi-Technology and Computers in Education Exhibition | Trade: Jan 24 10.00am-1.30pm Educationalists: Jan 24 1.00pm-8.00pm Jan 25 11.00am-6.00pm Public: Jan 26 11.00am-6.00pm | Barbican London EC2 | Free in advance from organisers | Computer Marketplace 01-930 1612 |
| Apricot and Micro Computer Show | Feb 5-7 10.00am-6.00pm | Kensington Town Hall London W8 | Free in advance from organisers | Paradox 01-241 2354 |
| The LET '85 International Trade Show | Feb 17-19 10.00am-6.00pm Feb 19 10.00am-4.00pm | Olympia 2 London W14 | Free in advance from organisers | Turret Wheatland 0896 777000 |

# Readers' Chart No 3

| | | | |
|---|---|---|---|
| 1 | (1) | Daley Thomson's Decathlon *(Spectrum/C64)* | **Ocean** |
| 2 | (7) | Knight Lore *(Spectrum)* | **Ultimate** |
| 3 | (4) | Elite *(BBC/Electron)* | **Acornsoft** |
| 4 | (—) | Ghostbusters *(C64)* | **Activision** |
| 5 | (3) | Underwurlde *(Spectrum)* | **Ultimate** |
| 6 | (2) | Beachhead *(C64)* | **US Gold** |
| 7 | (6) | Danger Mouse in Double Trouble *(Spectrum/C64)* | **Creative Sparks** |
| 8 | (9) | Pyjamarama *(Spectrum/C64/Amstrad)* | **Mikro-Gen** |
| 9 | (—) | Raid Over Moscow *(C64)* | **US Gold** |
| 10 | (—) | Jet Set Willy *(Spectrum)* | **Software Projects** |

**Week 3 Winners — S G Leggett, Bridge Road, Chessington, Surrey and C Mitchell, Wavertree Nook Road, Wavertree, Liverpool who share the £100 'pot' and receive £50 each.**

# Now voting on Week 5 — £50 to win

Each week Popular is compiling its own special software top ten chart — compiled by YOU.

All you have to do to vote is to fill in the form below with the names of your current three favourite software titles (or copy the form on to another sheet if you don't want to damage your magazine) and send it off as soon as possible to Top 10, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2H 7PP.

We will send £50 each week to the person who correctly predicts that week's top three. If there is no winner then that week's prize is automatically added to the chart on which voting is currently taking place and so on until someone gets it right! (If there is more than one winner that week's prize — whatever the 'pot' stands at — will be split equally between all the correct entries.)

**Voting for Week 5 closes at 2pm on Wednesday December 19. Entries received after that time will not be eligible for inclusion that week's voting. Only one entry per week per person is eligible for inclusion.**

**Name**......................................

**Address**......................................

......................................

......................................

**My top 3: Voting Week 5**

1......................................

2......................................

3......................................

# New Releases

## KICK OFF

Whilst *Football Manager* has fulfilled many peoples' demands for a Spectrum football game for a long time, being primarily a strategy test rather than an actual kick the ball around simulation. The Commodore got *International Soccer*, complete with large sprite players, cheering crowds and the rest, but there was nothing to touch it on the Spectrum.

That situation has changed, however, with *Match Day*, a sure fire winner from Ocean that lets you actually play a match using joystick or keyboard. Similar techniques to the Commodore game are used — the screen scrolls rather like the movement of a TV camera to follow the action as you pass the ball around, take throw ins, dive dramatically for the ball and so on.

The little men are created using a sprite routine which makes them appear slightly transparent, although generally speaking there are relatively few colour attribute problems. You can tell which of your team has possession of the ball (or is under your control for a tackle) because his socks change colour! An idea I hope to see in more matches in future.

There are a lot of options in the game — change name, change colour, two player game, play against the computer, etc, you can head the ball, pass the ball through the air or along the ground and generally test your footballing mettle. Ideal for Christmas, I should think.

**Program** *Match Day*
**Price** *£7.95*
**Micro** *Spectrum*
**Supplier** *Ocean Software*
*6 Central Street*
*Manchester M2 5NS*

## WONDER WEB

Adventure International's *Hulk* got a mixed response. The Spectrum version certainly had excellent graphic illustrations, but many people complained about the adventure itself. It was felt to be too difficult and too arbitrary — maybe people just weren't used to Scott Adams's deviousness.

Anyway, the sequel has just been released, initially on the Commodore, although with versions to follow on most other machines.

In this adventure Spider Man takes on Mysterio, evil impresario of tricks and illusions. The graphics are nice pure comic book stuff and of the adventure it's best not to speak until I've had longer with it. Suffice to say that a quick look suggests there are a vast number of options at the beginning, many of which look promising, so it shouldn't be too frustrating for beginners. Important too it understands a wide vocabulary and complex sentences reducing your infuriation levels still further.

**Program** *Spider Man*
**Price** *£9.95*
**Micro** *Commodore 64*
**Supplier** *Adventure International*
*85 New Summer Street*
*Birmingham B19 3TE*

## KEY PRESTO

From time to time computer magazines have printed programs which enable you to perform magic tricks with your computer, now Acornsoft has produced a commercial package for the BBC which collects some of the best computer tricks together under the title *Paul Daniels' Magic Show*.

Nothing too complicated here, though the manual explains how the tricks work and some look fairly impressive, enough to baffle aunts and uncles anyway. Not bad.

**Program** *Paul Daniels' Magic Show*
**Price** *£9.95*
**Micro** *BBC*
**Supplier** *Acornsoft*
*Betjeman House*
*104 Hills Road*
*Cambridge CB2 1LQ*

## BORING

Activision scored a winner of awesome magnitude with *Ghostbusters* but *Beamrider* is a definite plummet — quite honestly this is a £1.99 game being sold for £7.99. The plot, at least, requires little explanation, your laser ship sits on the end of various lines disappearing into the distance — like an edge on view of a flat grid.

Along this grid zoom baddies. You just blast away, occasionally a baddie is a different colour and has to be shot with a torpedo rather than a laser. Sometimes the baddies move in a different way. Amazingly boring — you have no reason to buy it unless you are a close relative of one of the programmers.

**Program** *Beamrider*
**Price** *£7.99*
**Micro** *Spectrum*
**Supplier** *Activision*
*15 Harley House*
*Marylebone Road*
*London NW1*

# This Week

| *Program* | *Type* | *Micro* | *Price* | *Supplier* |
|---|---|---|---|---|
| Crystal Theft | Ad | Amstrad | £7.95 | Wiccasoft |
| Fruity Frank | Arc | Amstrad | £8.95 | Kuma |
| American Football | S | Amstrad | £9.95 | Amsoft |
| Snooker | S | Amstrad | £8.95 | Amsoft |
| Screen Designer | Ut | Amstrad | £14.95 | Amsoft |
| Acheton | Ad | BBC | £9.95 | Acornsoft |
| Maze | Ad | BBC | £9.95 | Acornsoft |
| Quondam | Ad | BBC | £9.95 | Acornsoft |
| The Seventh Star | Ad | BBC | £9.95 | Acornsoft |
| Firebug | Arc | BBC | £9.95 | Acornsoft |
| Labyrinth | Arc | BBC | £9.95 | Acornsoft |
| Butterflies/Putting | Ed | BBC | £9.95 | Hodder + Stoughton |
| Introducing the Data | Ed | BBC | £14.95 | Blandford Press |
| Paul Daniel's Magic Show | Ed | BBC | £9.95 | Acornsoft |
| Tiles/Fence | Ed | BBC | £9.95 | Hodder + Stoughton |
| Time Flies/Tanker | Ed | BBC | £9.95 | Hodder + Stoughton |
| Black Box/Gambit | S | BBC | £9.95 | Acornsoft |
| Go | S | BBC | £9.95 | Acornsoft |
| Cocktail Maker | Ut | BBC | £9.95 | Acornsoft |
| Spider Man | Ad | Commodore 64 | £9.95 | Adventure Int. |
| Tristan and Isolde | Arc | Commodore 64 | £8.95 | CRL |
| Archon | Arc | Commodore 64 | £11.95 | Ariolasoft |
| Choplifter | Arc | Commodore 64 | £9.95 | Ariolasoft |
| Davids Midnight | | | | |



# New Releases

## A MESSAGE

How much longer can this continue? How many companies out there are working on games which involve 'over (several) screens' moving a little person alien, dog, cat, wombat or duck around them collecting keys crystals, comical trinkets or power orbs? How many have wacky comic music taken from post war musicals? And when all these tedious ingredients have been stuck together, how many of them will end up with a title that alliterates, with the second word being a proper name? Can I offer a word of advice to all such companies? Stop it now Please

*Mutant Monty*, and I quote, has only to make his way through 40 rooms collecting gold en route and rescue the damsel in distress, there are countless aliens all set to stop him' It is for the Commodore 64 It is by Artic. I'm depressed.

**Program** *Mutant Monty*
**Price** *£6 95*
**Micro** *Commodore 64*
**Supplier** *Artic Computing*
*Main Street*
*Brandesburton*
*Driffield YO25 8RL*

## OPERA, OPERA

*Tristan* and *Isolde*, Medieval German Classic diatonicistic shattering opera by Richard Wagner and now a computer game Well, not really This T+ I has nothing whatsoever to do with the previous ones except that it involves a princess and a prince and has, apparently, been developed in Germany

What it is is a rather strange animated graphic adventure All allowed actions have graphic consequences — the choices you have available are made from a menu screen which may or may not give you further options, eg, if you press W for walk you get a further set of options indicating directions.

The character that represents Tristan (although he is also titled Kunibert, somewhat confusingly, in the draft manual I have) is a very bizarre looking sprite who seems only to move one leg when he walks. I don't know why

As usual, the object of the quest is to rescue a poor woman — Isolde (although she is also called Kunigunde) so you move about picking up useful objects to get through various rooms — portrayed in a sort of 3D So far I've been bashed by monsters almost immediately so haven't got very far

It is quite unusual, and reasonably compelling in a funny sort of way, but I think it could

**Pick of the week**

## TAKE FIVE LINES

*Skool Daze* is such an obvious subject for a computer game it's a wonder nobody ever thought of it before (well, almost nobody) Not only is it a good idea, the programming is excellent and the graphics good enough to distinguish the different oiks from one another — the swot looks snooty and the bully lumbers about.

The screen displays a cross section of the school with schoolboys milling about, different classes taking place and so on. You control one particular schoolboy — Eric (although you may rename him if you wish) — who must retrieve some not altogether favourable school reports from the school safe before the headmaster sees them.

Retrieving the report requires you to master a plot so complicated it makes *The Big Sleep* seem like Enid Blyton Here goes (stop me if I go too fast for you) First of all, you have to make all the school shields flash by touching them — some you cannot reach and so you will need to tread on a lesser boy to reach them. This combined with attending lessons when told and leaving the school at playtime (otherwise you get lines — over 10 000 and game over) will make the masters become disorientated and, if knocked over, will give you one letter of the code of the school safe However, the history master will only reveal his letter if you get his date of birth and write it onto a blackboard before he enters that room (if the board is clean)

Having got all the letters, you then have to put them in various orders (you know that the Headmaster's letter is always first) To do that chalk the order of letters onto a blackboard, rush to the safe and see if it opens Anyway if you get an open safe you then have to rush around stopping all the flashing shields by jumping up and touching them again.

If the plot doesn't daunt you, you'll love *Skool Daze* it really does recall images of the Bash Street Kids and Lord Snooty and his pals and the graphics are wonderful.

**Program** *Skool Daze*
**Price** *£5 95*
**Micro** *Spectrum*
**Supplier** *Microsphere Computer Services*
*72 Rosebury Road*
*London N10 2LA*

# This Week

| | | | | |
|---|---|---|---|---|
| Magic | Arc | Commodore 64 | £9 95 | Ariolasoft |
| Eddie Kidd Jump Challenge | Arc | Commodore 64 | £8.95 | Martech |
| Gandalf the Sorcerer | Arc | Commodore 64 | £6.95 | Tymac |
| Hard Hat Mac | Arc | Commodore 64 | £9 95 | Ariolasoft |
| Hunchback II | Arc | Commodore 64 | £7 95 | Ocean |
| Kami Kaze | Arc | Commodore 64 | £8 95 | Supersoft |
| Kong Strikes Back | Arc | Commodore 64 | £7.95 | Ocean |
| Lode Runner | Arc | Commodore 64 | £9.95 | Ariolasoft |
| M U L E. | Arc | Commodore 64 | £11.95 | Ariolasoft |
| Murder on Zinderneuf | Arc | Commodore 64 | £11 95 | Ariolasoft |
| One on One | Arc | Commodore 64 | £9 95 | Ariolasoft |
| Operation Whirlwind | Arc | Commodore 64 | £8 95 | Ariolasoft |
| Realm of Impossibility | Arc | Commodore 64 | £8.95 | Ariolasoft |
| Raid on Bungling Bay | Arc | Commodore 64 | £8 95 | Ariolasoft |
| Spelunker | Arc | Commodore 64 | £8 95 | Ariolasoft |
| Football League Team | S | Commodore 64 | £3.95 | D Spencer |
| Birthday File | Ut | Commodore 64 | £14.95 | Blandford Press |
| Synth | Ut | Commodore 64 | £3 95 | D Spencer |
| Beamrider | Arc | Spectrum | £7 95 | Activision |
| Pitfall II | Arc | Spectrum | £8 99 | Activision |
| Skool Daze | Arc | Spectrum | £5 95 | Microsphere |
| Family Quiz | Ed | Spectrum | £14.95 | Blandford Press |
| Match Day | S | Spectrum | £7 95 | Ocean |
| Software Star | S | Spectrum | £6.95 | Addictive Games |
| Garden Planning + Ds | Ut | Spectrum | £14 95 | Blandford Press |
| Hisoft C | Ut | Spectrum | £25 | Hisoft |
| Ultrakit | Ut | Spectrum | £5 95 | Hisoft |

Key: Ad — adventure/Arc — arcade/Ed — educational
S — strategy-simulation/Ut — utility

use a couple of graphic designers beefing up some of the presentation. Good for fairly young kids perhaps

**Program** *Tristan and Isolde*
**Price** *£8.95*
**Micro** *Commodore 64*
**Supplier** *CRL House*
*9 Kings Yard*
*Carpenter's Road*
*London E15 2HD*

## 3-D FUN

*3D Starstrike* continues Realtime Software's flirtation with three dimensions seen most recently in its *Battlezone*-inspired 3D tank game.

*3D Starstrike* is a fast reflex game with several sections and plenty of vector style line graphics. The first section is pretty much a straight shoot the baddies in space before they shoot you, but the graphics are good and even the sound, usually hopeless on the Spectrum, is reasonable

If you survive this you arrive at your target s planet littered with 3D skyscrapers whose tops you can blast to bits. Eventually find a duct leading to two cooling ports which, if destroyed, lead by some means or other to the end of evil everywhere

The duct section is particularly good fun — you appear to fly down a narrow channel with barriers blocking the way — to get through you need lightening responses to avoid hitting them. Personally, I often find multi section games a bit disjointed — the different bits too often look as though they have been bodged together to make the game a bit more interesting Here I think it works though — the pieces slot together neatly A must for the arcade fan.

**Program** *3D Starstrike*
**Price** *£5.95*
**Micro** *Spectrum*
**Supplier** *Realtime Software*
*Prospect House*
*35 Sovereign Street*
*Leeds LS1 4BJ*

## TON UP

*Motocross!* is a motor cycle game for the Commodore 64 — possibly the only one. Released in America by Tronix, it has been imported and issued here by System 3 Software.

Visually it s nothing spectacular — the path is marked out by a sort of bollard arrangement and the motorcycle and rider are pretty small. However, the actual game is pretty good, apart from anything else it is astonishingly fast and really does require quick reflexes

Not only must you guide your bike around an increasingly difficult track but, unlike some other racing type games, the track is chock full of other riders whom you must avoid and, if possible, overtake It proves you don't need spectacular graphics to create exciting games Well worth a look.

**Program** *Motocross!*
**Price** *£7.95*
**Micro** *Commodore 64*
**Supplier** *System 3 Software*
*135 Carlton Avenue East*
*Wembley*
*Middlex.*

## FAIR FUN

*Kong Strikes Back* is a sequel to *Donkey Kong* which means, roughly, that you get exactly the same ideas, but with some different backgrounds and settings. So you have to move a little man around dodging things until he reaches a damsel in distress

However, Ocean's Kong sequel is definitely better than sequels usually are, a little thought has gone into it. Kong has escaped (again) and has taken refuge in a funfair high up on a roller coaster. You must find your way around the roller coaster clambering along the tracks up to Kong and helpless woman.

That may sound pretty boring, but the fairground music, the way the cars speed up and slow down according to the slope of the track and the general pace of the game make it quite good fun.

**Program** *Kong Strikes Back*
**Price** *£7.95*
**Micro** *Commodore 64*
**Supplier** *Ocean Software*
*6 Central Street*
*Manchester M2 5NS*

**Compiled by Graham Taylor**

New Releases is designed to let people know what software is coming on the market. If you have a new game or utility which you are about to release send a copy and accompanying details to New Releases, *Popular Computing Weekly* 12-13 Little Newport Street London WC2H 7PP

# This Week

**Acornsoft,** Betjeman House, 104 Hills Rd, Cambridge CB2 1LQ, **Activision,** 15 Harley House, Marylebone Road, London NW1, 01 486 7588, **Addictive Games,** 7a Richmond Hill Bournemouth BH2 6HE, 0202 296404, **Adventure Int.,** 85 New Summer Street, Birmingham B19 3TE 021 643 5102, **Amsoft,** Brentwood House, 169 Kings Road, Brentwood, Essex, 0277 230222, **Ariolasoft,** Retail only, **Blandford Press,** Link House, West Street, Poole Dorset, 0202 671171, **CRL,** CRL House 9 Kings Yard, Carpenter's Road, London E15 2HD, 01 533 2918 **D Spencer,** u/k **Hisoft,** 180 High Street North Dunstable, Beds LU6 1AT, 0582 696421, **Hodder + Stoughton,** PO Box 704 Mill Road, Dunton Green Sevenoaks Kent TN13 2YG, **Kuma,** Kuma Computers 12 Horseshoe Park, Pangbourne RG8 7JW 07357 4335, **Martech,** Martech House Bay Terrace, Pevensey Bay East Sussex BN24 6EE, 0323 768456, **Microsphere,** 72 Rosebery Road, London N10 2LA, 01 883 9411, **Ocean,** 6 Central Street, Manchester, M2 5NS, 061 832 6633, **Supersoft,** Winchester House Canning Road, Wealdstone, Harrow Middlesex HA3 7SJ 01 861 1166 **Tymac,** Nettleton House, Calthorpe Road Edgbaston, Birmingham B15 1RL, 021 643 9524, **Wiccasoft,** 107 Bollington Road, Bollington, Macclesfield, Cheshire SK10 5EL

This Week is a new section that covers all the new software coming on to the home micro market each week. All suppliers should send details of their new programs to This Week *Popular Computing Weekly* 12-13 Little Newport Street London WC2H 7PP

## Nightmare world

Over dinner the other night with an accountant friend of mine the subject of artifical intelligence came up I, of course, was arguing vehemently, that his job would be one of the first against the wall come the computer revolution and he, equally of course, was arguing that no computer could ever replace his ability to spot a fraudster at 20 paces

Now, fascinating though this conversation was for a while, it occurred to me that both our conversation and many similar debates filling the pages of scientific journals at the moment, are grasping the nettle at the wrong end.

The important question to debate is if we need new technology not to speculate idly about what we believe will or won't be possible

In any event the latter question demands a high level of scientific knowledge and foresight, whereas the former simply requires the good common sense of the man on the Clapham omnibus.

So, let us remove the need for scientists for a while by assuming that they *have* managed to construct a super computer/program/robot capable of carrying out any task we might wish and ask ourselves the question — what do we want it to do?

Well for a start, we can replace all the dangerous, unpleasant and repetitive jobs such as coal mining, rubbish collection and factory line assembly The wealth of human talent released could be re-employed in management jobs and the like by the boom created through cheaper energy and manufacturing costs.

Why stop there? Our super computer could also replace these new management jobs It could run all aspects of industry from process and control to marketing leaving the workforce free to take life easy doing whatever gives them pleasure

Indeed the last area of human endeavour would be in the leisure field. A small elite of mankind would be exploiting their artistic talents keeping the rest of us entertained

This, incidentally, is very much the kind of utopian 'golden age' that Sir Clive Sinclair keeps telling us we are on the brink of achieving

But, now remember my premise that the super computer can replace any human task (only faster and better) — even these few jobs could go leaving all of us listening to computer-generated music and TV pictures or reading computer written and published books whilst eating our computer cooked dinners!

A nightmare? Definitely We shouldn't be discussing *if* we can make these machines, but rather *how* we can *stop them being made*, which is not as easy as it might seem.

We live in a world economy To be successful we need to compete for business If the Japanese and Americans install computers to mine their coal and oil or build their cars cheaper and better then we must, in a capitalist, non protectionist, world, do the same

This upward spiral of automation has been continuing for centuries and the pace of development of tchnology has always kept pace with our desire and need to use it. I see no reason to suppose that this trend will come to an end now unless we actively intervene and do something about it.

I am no Luddite but unless we do something immediately we will head inexorably for the nightmare world I've described.

**Glen Counsell**

## Squared ages

**Puzzle No 137**
Professor Ono Hex was browsing through some back copies of *Mathematical Monthly Miscellanea*, the popular journal for all number freaks, that has just celebrated its fiftieth anniversary One of the issues which attracted his attention was the following:

"Readers may be interested to know that this year is a very important one for London mathematics teacher Mrs Annie Nutt. It has been pointed out that Mrs Nutt, her daughter and her grand-daughter all have ages (in years) whose squares are in arithmetical progression. In other words, the difference between Mrs. Nutt's age squared and her daughter's age squared is the same as the difference between her daughter's age squared and her grand-daughter's age squared. But what is even more remarkable is that that difference is exactly equal to the present year!"

Unfortunately, the ages were not given But the Professor, assuming that the ages were biologically and legally possible, was able to work them out. But then, of course he did have the advantage of knowing the date of the journal.

Can you determine what these ages were, and say in which year this curious coincidence took place?

**Solution to Puzzle 132**
I took books numbers 2,5,6,8 and 9 having respectively 89 147 168 192 and 204 pages. This makes a total of 800 pages.

The program puts the values representing the number of pages in each book into an array The five *For/Next* loops then call these values in sequence and test the totals to determine if it equals 800

```
10 DIM A(10) 20 DATA 84, 89, 107, 111, 147, 168, 178,
192, 204, 241 30 FOR N = 1 TO 10 40 READ X 50 LET
A(N) = X 60 NEXT N 70 FOR P = 1 TO 5 80 FOR Q = P
+ 1 TO 7 90 FOR R = Q + 1 TO 8 100 FOR S = R + 1 TO
9 110 FOR T = S + 1 TO 10 120 LET X = A(P) + A(Q) +
A(R) + A(S) + A(T) 130 IF X = 800 THEN PRINT
A(P);A(Q);A(R);A(S);A(T) 140 NEXT T 150 NEXT S 160
NEXT R 170 NEXT Q 180 NEXT P
```

**Winner of Puzzle No 131**
The winner of Puzzle No 132 is Phil Arney of Hillmont Rd, Esher, Surrey, who recieves £10

**Rules**
If the puzzle can be sensibly solved using a computer, then the winner will have included a listing of the program used to find the correct answer The closing date for Puzzle No 137 is December 28.

## The Hackers


A LAUNDROMAT, SOMEWHERE IN PILAND (WHERE THE AUTOMATA MOB HAVE GONE TO FIND OUT ABOUT THEIR TAX) CLAIR IS TUCKING INTO PLASTICENE SANDWICHES, BUT WHO GETS THE TAX RELIEF? THEN THERE . THIS ANGEL
NOW WE'VE RESCUED THEE, 'OW ABOUT THIS MESSAGE?
MY MESSAGE IS FOR THE WHOLE-SALERS! I MUST SPEAK UNTO THEM, AND SPREAD THE WORD ABOUT DEUS EX MACHINA!
IS HE ON OUR SIDE?
NO, HE'S ON 5%
THE ANGEL OF PI GLEAMS OVER WHOLESALERLAND.
DEUS EX MACHINA IS SWEEPING THE NATION! DON'T DIP OUT! ALL THE PEOPLES WANTS IT NOW!
OKAY - BUT WE CAN'T PAY FOR A WHILE
THEY'D LIKE MONEY UP FRONT
OKAY, IF WE CAN HAVE 90% DISCOUNT
NAH
I'M WILLING TO DISCUSS IT. I'VE READ THE REVIEWS OF DEUS!
ME TOO. MY COMPANY IS VERY INNERESTED
SUCKERS! IT'S ALL HYPE...
DON'T CAVE IN TO THEM! I KNOW DEUS IS GOOD BUT IT'S OUR DUTY TO BLEED THESE SMALL COMPANIES WHITE AND
THAT'S NOT THE WAY I SEE IT PAL! ANYONE ELSE COMING ALONG WITH ME?
YEAH
RENT A CAMEL
ME TOO
SO THE THREE WISE WHOLE SALERS LEAVE THE FOOLISH WHOLESALERS AND CAMEL IT TO PILAND
THERE IT IS! THE PI IN THE SKY!
WE GOTTA GO THROUGH CUSTOMS YET LADS!
WE'RE 3 WISE WHOLESALERS HERE ON BUSINESS. I REPRESENT THORN EMI
I REPRESENT TERRY BLOOD
I REPRESENT LIGHTNING AND CENTRESOFT
ANYTHING TO DECLARE?
CUSTOMS
NOPE!
YOU'D BETTER TAKE ALONG SOMETHING! SHE'S THERE EATING COAL LIKE THERE'S NO TOMORROW. COME ON ROLL UP! RATTLES, BOOTIES, WATCHES, EARRINGS, PEN SETS
BACK IN THE CAR PARK
THIS PLACE IS GROWING ON ME. IT LOOKS DEAD COSY WITH THESE CRAZY DECORATIONS
AYUP - IS THAT THE BEATIN OF 'UGE WINGS I EAR?
BLIMEY! IT'S A STORK
NAY, LAD. LADY CLAIR ALWAYS USES BUTTER!
SIGN HERE
AHAHA! I'VE BEEN EXPECTING THIS TA
LEMME SEE MY LIL TAX REL ER, KID!
YOUR KID? MINE, I THINK
YOU'RE BOTH WRONG, IT'S
IT'S - GAGAAA GAAA SA
WHO PLACED THE ORDER FOR THIS LIL CONSIGNMENT? FIND OUT NEXT WEEK!!